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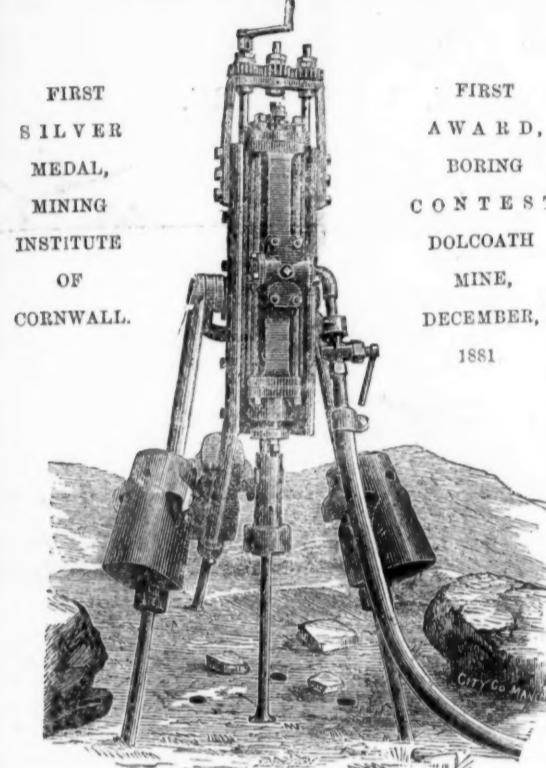
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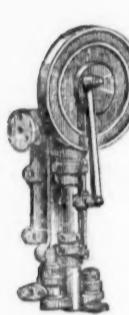
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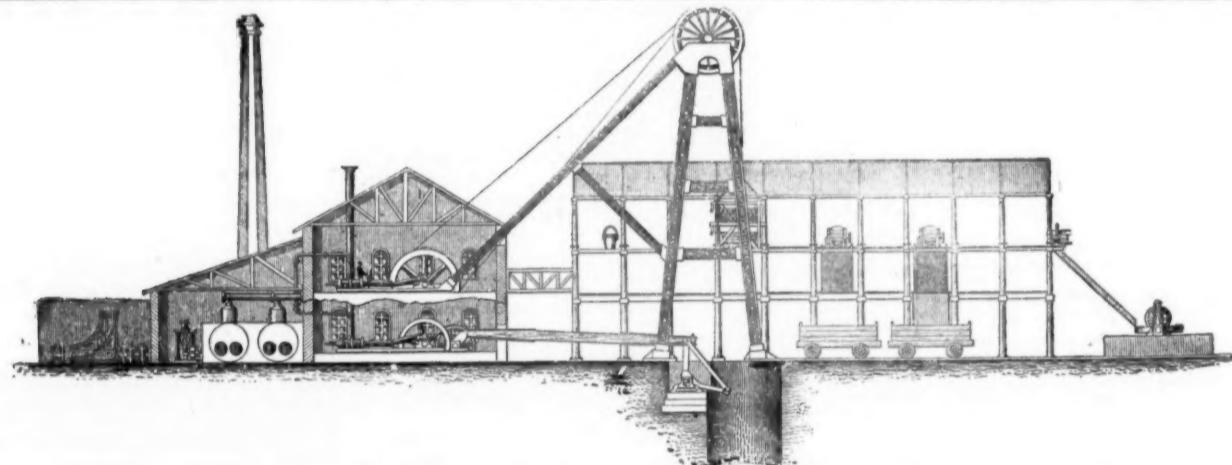
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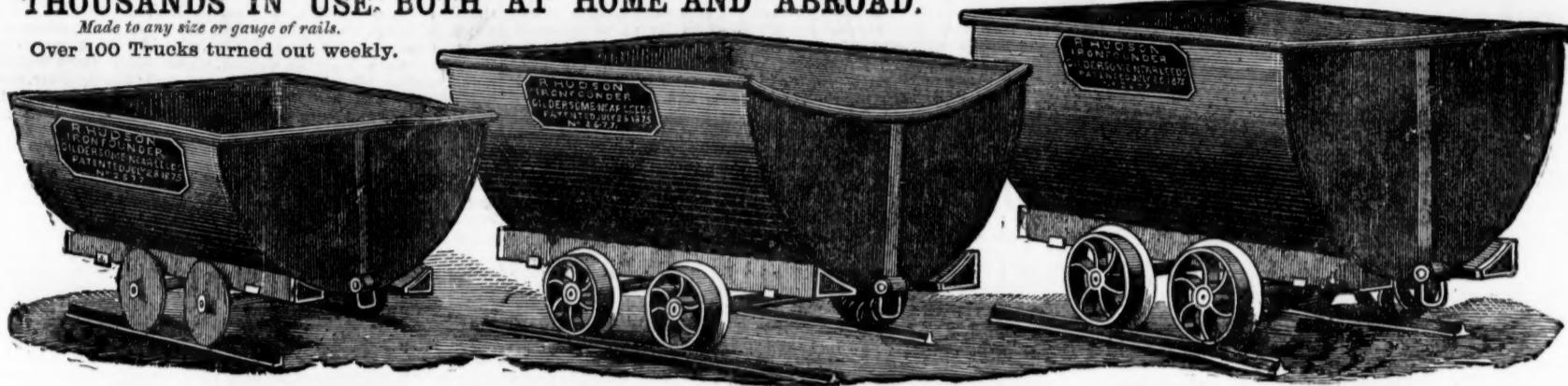
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INDIAN GOLD MINING, AND ITS PROSPECTS—No. VII.

QUARTZ OUTCROPS OF TRAVANCORE.

By J. MACDONALD CAMERON, F.R.S., &c.

(Late Assistant Chemical Laboratories, Royal School of Mines).

Thirty years or more ago, if one were to suggest the crushing of quartz with the object of obtaining from it gold in paying quantities, one would not be listened to, as the following quotation from a letter "On Gold in the Madras Presidency," published in the *Mining Journal* of Nov. 20, 1878, by Mr. Jackson Barwise, will show:—"A great surprise appears to have been created by the announcement of the discovery of gold-bearing rocks in the Madras Presidency by finding some quartz reefs on the west escarpment of the Neilgiri Mountains, as though there had not been evidences that such a fact must have existed for centuries; but, as according to the old idea that gold was only found in auriferous sands in the rivers, the matrix of the gold was never looked for, and until 1849 no European geologist dared venture to assert that gold had a matrix, and it was considered one of the things in creation that was motherless. When the first samples of quartz showing that gold had a matrix were shown by me in 1849, the fact was scoffed by some of the first geologists of that day as an unheard of thing, and a very eminent man of that time had, I may say, the impudence to tell me that the specimens I showed him had been manufactured at Birmingham, and were fine samples of ingenious manufacture from that seat of industry. Thirty years' experience has given us very extended ideas of the mineral formations and deposits, and the old dictum that gold was to be found only in auriferous sands, and that it grew there year by year, is quite exploded, and that where these sands are found it must follow that there must exist in the mountains reefs containing the precious metal, the disintegration of which forms the continuous renewing sources of the metallic deposits found in these sands."

Now, it is perhaps needless to mention that we have several Australian companies which are paying satisfactory dividends after raising their pyritous stone in many instances from considerable depths.* One company getting part of its ore from surface workings has profitably crushed 283,550 tons, with an average yield of 2 dwt. 22 grs. Another treated 7,453 tons of quartz in seven months, with only a return of 2 dwt. 10 grs. per ton, and paid 2101L 10s. profit. Another realises a large profit from a yield of only 1 dwt. 14 grs. per ton of ore crushed. But the most remarkable of all is the Imperial Company at Ballarat, which has treated 2100 tons of quartz, affording only 21.99 grs. of gold per ton, with a fair margin of profit on the operation. Indeed, it has been making money out of material which is only one-tenth part as rich as the non-pyritous material which its neighbours are throwing away.

It must be highly gratifying to Mr. Barwise to have lived to witness the opinions he held and fearlessly expressed upwards of 30 years ago in regard to the advisability of attacking the quartz matrix for our gold supply, so completely triumphant. It is but another of the many striking examples of how careful we should be not to bow down too submissively to theories based upon the authority of individuals, no matter how great may be the official or professional halo which may surround them, or how experienced they may be. The experiences of the past teach us, at any rate in a general way, what we may expect in the future, provided like conditions and circumstances obtain, and if the generally accepted theories of the past failed to point to discoveries which were subsequently made, it cannot be unreasonable to suggest that some at any rate of the accepted theories of the present will fail to point to discoveries of the future. Man is young, but even the latest of the geological formations, including the one upon which he exists, is very old. We must concede that he has done much by his indefatigable perseverance and assiduity to read the secrets which lie hidden in the various strata which compose these formations; but the great stimulus to this work has been, is, and shall ever continue to be, his necessities and growing requirements, and if we will but read between the lines we shall find that this is the chief principle by which all animated Nature lives, and by which the higher intelligences move onwards to a still higher and grander development. Whenever any material which in the past has ministered to man's necessities shows evidences of exhaustion or discontinuance, his ingenuity is at once set to work to find out a substitute, and the very effort to do so often reveals resources and powers which previously were unknown. So far as the world's gold supply is concerned, we know that it has frequently occurred to him during these last 30 years that a time would arrive when known auriferous deposits would become exhausted or fail to yield a sufficient quantity of the precious metal to meet growing requirements. Once convinced of this, he quickly sets about discovering the origin of these deposits, and no sooner had he succeeded in this than he summoned to his aid known mechanical forces and principles, and devised machinery which can disintegrate and render impalpable the auriferous matrix in a period of time almost infinitesimal when compared with the incalculable ages which Nature has taken to accomplish the work. Now, the crushing of auriferous quartz has become the most satisfactory and surest method of obtaining a continued supply of the metal, granting in the first instance a practically inexhaustible supply of stone, and a reasonably proportional quantity of gold per ton, whilst alluvial deposits are fast becoming the heritage of those whose intelligence and resources confine them to more primitive and empiric methods of extraction.

To return to the question of the value of quartz beds. I noticed in Art. VI., *Mining Journal*, page 683, that such beds had already been worked with success. In 1878 Dr. Sterry Hunt, F.R.S., made a report to Sir W. E. Logan, Director-General of the Geological Survey of Canada, on the quartz outcrops of Nova Scotia, showing not only their geological position but their auriferousness, and as portion of that report bears upon the question at issue—the value of quartz beds as a source of gold—it will, I think, be interesting to quote from it. Dr. Hunt says—"Although the Arcadian Geology of Dr. Dawson was published in 1855, some years before the discovery of gold, there will be found in its 15th chapter a somewhat detailed description of the coast district of Nova Scotia, which has since become famous as a gold region. This consists of a zone of ancient stratified rocks lying exposed between the overlying strata of the carboniferous system on the north-west and the ocean on the south-east, and having a breadth of from 30 to 50 miles in the wider portions, which to the north-east is reduced to not over eight miles. This belt of rocks extends along the Atlantic Coast for a distance of about 250 miles from Cape Sable on the west to Cape Constance on the east, and has a surface of about 600 square miles. Its surface is generally low, rising, however, in some places to about 500 ft. above the sea, and is in great part rocky and barren, the powerful denuding agencies to which in past times it has been exposed having over a large portion of this area removed the alluvial deposit with which it was once covered, and left upturned and worn edges of the strata bare, or covered only with boulders of quartzite or granitic rocks. The rocks of this region consist chiefly of slates and quartzites; they are, however, cut in many places by intrusive granites, and in addition to these several small areas of gneissic rocks occur in different parts of the belt, but their true relations to this great mass of the strata are not yet clearly made out. Leaving those aside, the rocks which cover the principal part of the area under consideration are by Mr. Campbell divided into a quartzitic group and a clay-slate group, the latter conformably overlying the quartzite, and the two constituting a gold-bearing series. The total measured thickness of these two divisions is, according to the same authority, nearly two miles, but the gold appears to be chiefly confined to the quartzite and the lower portions of the clay-slate division. The geological age of these rocks is uncertain, although comparatively little altered, they are without fossils so far as is yet known, and are very unlike the fossiliferous Upper Silurian and Devonian rocks met with in other parts of the province. At the same time the high antiquity of the gold-bearing strata is known by the fact that the carboniferous system rests upon their upturned edges, and is partly formed from their ruins. In the present state of our knowledge it appears probable that they may represent a part of the Lower Silurian series, which, like the Upper Silurian series and Devonian of this part of the Continent, may be supposed to consist chiefly of non-calcareous sediments. The rocks of the gold series are affected

by undulations running nearly east and west, which have raised the strata to high angles, often approaching the vertical. According to Mr. Campbell there are not less than six anticlines exhibited on a transverse line of section, extending from the sea shore at the south-east entrance to Halifax Harbour, northward to the Renfrew gold district, a distance of about 35 miles. The direction of these nearly parallel anticlines is about east and west, but to the westward trend towards the south, and to the eastward in like manner disappear beneath the sea between Cape Constance and Liseville Harbour, with a strike east 30° south. In addition to the great east and west folds the gold series is affected by a second series of more gentle undulations, having a north and south direction, and producing transverse anticlines, on the crests of which the gold-bearing portions of the series are brought to the surface. While they are concealed not only in the great east and west synclines, but also on the north and south synclines, where these traverse the east and west anticlines, the total thickness of the series, as already stated, is estimated at about two miles, and the amount of erosion on the crests of some of the anticlines, according to Mr. Campbell, cannot be less than 1/2 mile in vertical thickness, of which the upper half mile, consisting of clay-slates, is generally sterile. Since, so far as yet observed, the gold is confined to the quartzite and the lowest portion of the overlying clay-slate, it would follow that wide areas of the latter holding the upper portions of it will be destitute of gold, or yield it only along a narrow belt where the lower and auriferous portions of the strata may be brought to the surface along the line of an anticline, as is observed, according to Mr. Campbell, at the Ovens gold field. When, on the contrary, erosion has exposed a wide zone of the underlying quartzite on the crest of an anticline, the width of the area in which gold may be sought for is much increased. * * *

Having thus acquired a general notion of the geological structure of the region, we may consider its lithological characters, which are very simple. The quartzite which forms the principal rock of the lower division, interstratified, however, with those layers of bluish argillite or clay-slate, is essentially a granular quartz rock, with an apparently argillaceous cement, sometimes considerable in amount. It is hard and grey in colour, passing into blackish or greenish in the interior, but becoming nearly white on weathered surfaces. Its lines of bedding are distinct, and besides two sets of joints which affect cause it to break into regular rhombic masses, it occasionally shows a slaty cleavage independent of the bedding, and from a development of mica in the cleavage planes passes into a very quartzose mica slate. The quartzite of this region is by the miners generally designated "whin," the vulgar name in Scotland for a greenstone diorite, which somewhat resembles it in colour and texture, though a softer rock than the Nova Scotia quartzite. The slate which is interstratified is thus found with the quartzites, and frequently forms the underlying rock of the gold-bearing quartz lodes, is generally a soft and fissile bluish or greyish argillite or clay-slate, and the same may be said of the strata which forms the base of the upper or clay-slate division of the gold series, so far as I have had the opportunity of observing it. A peculiarity of this neighbourhood which strikes every mineralogist is the great rarity of everything like calcareous rocks or minerals; this is seen in the absence of limestone, serpentine, diorite, or other hornblende rocks, and of talcose or chlorite slates, nothing of the kind being met with in most of the gold districts. Prof. Silliman, however, mentions the rare occurrence of chloritic slate, and also of epidote, and staurolite in minute crystals in the Tangier district, and of a green magnesian rock resembling serpentine and holding gold at Wine Harbour. Small portions of chlorite are found in the quartz lodes at Sherbrooke, Oldham, and Montague. Chloritic and hornblende rocks, according to Dr. Dawson, occur near Yarmouth, and in the peninsula which terminates in Cape Constance, fine-grained gneiss, also much mica slate and clay-slate abounding in crystals of chalcocite, are met with."

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THE MINERAL RESOURCES OF MONTANA.

Although some attention has recently been given by British capitalists to mining in Montana, comparatively little is yet known with regard to the vast mineral resources which there await the application of capital and industry, and promise lucrative results. It appears that at the present time, with the single exception of Leadville, Colorado, the mining district of Butte is the most productive in the United States, and at the present ratio of increase the ore output will exceed that of the great carbonate camp within the next three years. Last year Butte contributed to the wealth of the world the enormous sum of \$6,881,000 in silver, gold, and copper, the copper mines contributing over one-half of that vast amount. The product of Butte is five-sixths of that of the entire territory, and at the present rate of production the output for the current year will exceed \$10,000,000. A single mine in this district last year furnished a greater tonnage to the railroad than all the other mines outside of this county in the territory combined. It was the Colusa, which according to vouchers, which may be seen at the company's headquarters in New York, shipped upwards of 8000 tons of ore and matte. Within a radius of two miles of Butte city are at least six mines of equal productive capacity, and one, the Anaconda, which has been developed to the 600 ft. level, is fully demonstrated to be a much greater property. Experts have pronounced the copper belt of Butte to be the richest and most extensive in the United States, and a brief inspection will satisfy any comprehensive mind that the statement is not exaggerated. The fact that one good copper mine will furnish more tonnage to a railroad than a dozen silver or gold properties explains why brief special mention, to be supplemented further on, has been made of the copper mines of Butte.

The most important mining operations are carried on by about half a dozen companies, and there are five or six large smelting concerns. Beginning with the mines, the Alice has two mills and 80 stamps; the Lexington, two mills and 60 stamps; whilst the Moulton, Silver Bow, Dexter, and Clipper, have each one mill, with a capacity of 40, 30, 15, and five stamps respectively. The Montana Copper Company has a smelter of the capacity of 100 tons, the Parrot, the Bell, and the Colorado and Montana have each smelters of 50 tons capacity, whilst the projected Anaconda smelter is to have a capacity of 500 tons. With the exception of the last, says the Intermountain, from which these details are taken, these works are all in successful operation. Last month's production of the silver mills above mentioned was as follows:—Lexington, \$98,276.21; Alice, \$94,987.60; Moulton, \$41,681; Silver Bow, \$36,724; Dexter, \$25,468.56. The Montana Copper Company is running six calcining and one blast furnace, which together treat an average of 100 tons of ore daily, the matte product of which is from 25 to 30 tons, according to the quality of the ore which assays from 20 to 35 per cent. copper. Over 2000 tons of crude ore, which, before the decline in copper, was of shipping quality, are now piled up at the smelter awaiting a lower rate of transportation, the present rate of \$40 to Baltimore being considered too high. The superintendent says he will hold it until the completion of the Northern Pacific, and that the amount of it available for extraction in the mine would easily suffice to load a daily train of a dozen cars for a year, notwithstanding the fact that the mine is only 260 feet deep. The Parrot Company, with an extensive and well-developed mine to draw from, treats in its smelter from 50 to 75 tons of ore daily, and ships from 10 to 15 tons of matte daily. The capacity of the smelters is being rapidly increased. The Bell smelter has two blast-furnaces, each with a capacity of 25 tons daily. A new shaft has been started on the mine, and it will soon be fully opened up on the 400-ft. level. The vein is from 8 to 24 ft. wide. The smelter having just started up is not yet in full blast, but is now shipping daily from 10 to 15 tons of high grade matte. The Colorado and Montana is a branch of the great Argo Works, of Argo, Colorado, owned by Senator Hill and others. The company has lately bought a number of rising properties in this district, but still works custom ore to a large extent. Mr. Williams, the superintendent, states that he has fully 10,000 tons delivered and available for reduction.

Among the silver mining companies the Alice is the most extensive; both from the Alice and Magna Charta Mines the supply of ore is abundant. The lowest point of development in the Alice is

775 ft., and the ore in the bottom is of the most encouraging character. The Alice has paid \$400,000 in dividends, and now that heavy expenditures for improvements have recently been made, dividends will be resumed. The richest silver mine in Montana is undoubtedly the Lexington, which was purchased in 1881 by a French syndicate for \$3,000,000. It is fully explored to a depth of 400 ft., and Messrs. Medhurst and Wartenweiler, the manager and superintendent, estimate by careful measurement that the ore supply now in sight is sufficient to supply the 60 stamps of the company for three years. The monthly product since last fall has in no instance fallen below 95,000. The Moulton Mill has been continuously operated since the structure was built. The mine is 500 ft. deep, and fully explored down to the 400 ft. level, showing in the west workings a well defined, regular, and extensive ore shoot, from which enough ore is readily extracted to supply the mill and keep a 1000 ton surplus constantly on hand. The Silver Bow Company draws its ore supply from a number of rich and promising mines, among which are the La Plata and Mount Moriah, both well developed and productive properties. The bullion product of the mill amounts to \$35,000 monthly with the present quality of ore. The Dexter Mill, under lease to the Anaconda Company, is treating the free silver ore so abundant in that great property above the copper zone. Besides the properties owned by these companies are the Gagnon, which has produced \$1,000,000, and in which a bonanza was recently opened; the Shonbar, the Acquisition, the Clear Grit, Ramsdell, and Shakespeare Copper Mines, the Liquidator showing a copper ore body 35 ft. wide at the 200 ft. station; the Madoc and many others of equal value owned by private parties, and most of which are in successful operation.

No man of quick intelligence, business aptitude, and powers of observation can visit Butte even for a day without being deeply and unalterably impressed with the extent and permanence of its rich mineral resources. Besides 23 mines, fully equipped with complete hoisting and pumping apparatus, and having shafts from 200 ft. to 775 ft., which comprise the leading developed mines of the district and which are all in active and, with but few exceptions, profitable operation, there are at least 25 valuable claims, with shafts varying in depth from 75 ft. to 150 ft. Some of them are paying a profit, some only expenses, and some are lying idle, either for lack of capital or because of the cost of reduction at the custom mill and smelter. The reason for this is plain. While the smelters and mills have to pay the present high rates for transportation of coke from Pennsylvania, salt and coal from Utah, and fluxes from other points, and while the freight on ore and matte to Baltimore remains as at present, the cheap reduction of ores is impossible; but with a lower freight rate to and from the east, Butte, lively as it is now, would become a city of 25,000 people within a few years, because the mines of this district if developed to their full capacity will legitimately support such a population. The mines, mills, and smelters give direct employment to between 2500 and 3000 men. The silver and gold bullion shipments from the district vary from \$400,000 to \$500,000 per month. The present shipments of copper matte and crude copper ore average 100 tons per day, which projected new reduction works will increase 50 per cent., within the next year or 18 months.

Butte is in vital need of another railroad. The Utah and Northern has already accomplished a great deal of good for the camp, but the district can and will give most liberal support to a competing line. In the interests of Butte, in the interests of the mining industry of Montana, of which Butte is the bright particular star,* and in the interests of the Northern Pacific Company itself, it is to be hoped that our distinguished railroad visitor will order the early completion to this city of the branch from Blackfoot. The business of the Anaconda Company alone is almost sufficient to induce the early completion of the enterprise. There are in this district nearly 5000 mineral locations, of which over 1200 are covered by United States patent. Not a tithe of this vast wealth has been explored, but if there were not a mine in the district except those which have been mentioned, there still would be a guaranteed carrying traffic sufficient to make a branch of the Northern Pacific one of the best paying branch lines in the Union.

CAPE COPPER MINING COMPANY.—The directors of the Cape Copper Mining Company, on Monday evening, gave a dinner at the Albion Tavern, Aldersgate-street, to Mr. J. X. Merriman, senior member for Namaqualand, in which the company's mines are situated, and Commissioner of Crown Lands and Public Works in the Cape Parliament. A number of gentlemen connected with South Africa were also present, including Mr. E. A. Pontifex (who occupied the chair), Mr. Giles, M.P., Sir John Coote, Mr. J. Galsworth, Mr. W. Bevan, Mr. A. Focking, Mr. J. C. Leaver, Mr. D. P. Blaine, Mr. E. J. Carson, Mr. M. R. Robinson, Mr. Gibert Farie, Mr. R. Taylor, and Mr. Hanbury-Barclay.—In responding to the toast of his health Mr. Merriman referred to the mission on which he is at present engaged in England, and remarked that it was extremely gratifying to him on his arrival in this country to receive an invitation to dinner from his constituents, the Cape Copper Mining Company, who had developed with most satisfactory results, what had been described as an impossibility—that was to govern a large number of people who were not represented with Parliament sitting close by them. They asked the Imperial Government to discharge what they felt was an Imperial responsibility. He had received an encouraging reception from all parties, as well as from the Government. An idea had gained ground in many colonies to the effect that the British Government was anxious to get rid of its colonies. He, however, had met men of all shades of opinion, and he found that Liberal politicians were just as anxious to maintain the Empire as any others. That was a message which he should be glad to take back to the people of the Cape Colony. He would be able to say to them that Great Britain was anxious to take her share of responsibility if they were willing to take theirs. Notwithstanding what had been said of the colonists in certain quarters, all they wanted was peace, in order that they might develop the very great resources of the country.

INDIAN GOLD MINING INDUSTRY: ITS PRESENT CONDITION AND ITS FUTURE PROSPECTS.—It is now a generally admitted fact that although gold can no doubt be found in India as in almost every other country, it does not exist in sufficient quantities to repay those attempting to extract it. Excepting, perhaps, to the 83 directors and the officials under their control the result has been disastrous to all concerned, and to endeavour to retrieve past failure by further expenditure would be following a more forlorn hope that to attempt to make Welsh or Irish gold mining remunerative. As a brief record of the history of Indian gold mining during the past three years the pamphlet of Mr. D. Leighton (Madras: Higginbotham and Co.) will be valuable to many. Considering that the public, exclusive of anything they may have paid in the way of premiums on shares bought, Mr. Leighton's conclusion is scarcely reassuring:—"The unhealthy excitement of 1880 and 1881 has not been altogether without advantage. It has stimulated a search for localities where mining may be tried with reasonable hope of making profits from the gold obtained. The lessons of the past three years have not been altogether thrown away. Already in several districts operations have been commenced on conditions which justify the expectation that success will be achieved. Whether that expectation will be realised or not time alone can show."

DIED, on June 5, at Fairhaven, Windermere, Mr. JAMES BARRETT late of Mary Tavy and Broughton-in-Furness, aged 77 years.

HOLLOWAY'S PILLS—WEAK STOMACHS.—The distressing symptoms arising from enfeebled digestion are almost numberless, and all of them can be readily dispelled by these admirable pills. They clean the furred tongue, and remove all unpleasant tastes from the mouth, with flatulence and constipation. Holloway's pills rouse the stomach, liver, and every other organ, helping digestion to that healthy tone which fully enables it to convert all we eat and drink into the nourishment of our bodies. Hence these pills are the surest strengtheners and the safest restoratives in nervousness, wasting, and chronic debility. Holloway's pills are infallible remedies for impaired appetite, eructations, and multitude of other disagreeable symptoms which render miserable the lives of thousands of our fellow creatures. These pills are approved by all classes.

* Paper read before the Society of Arts by Mr. Alfred G. Look, F.R.G.S.

Original Correspondence.

SAFETY-LAMPS IN COAL MINES.

SIR.—I have long intended publishing my opinions in regard to the use of safety-lamps in coal mines. There are a variety of opinions on the long-mooted question of whether they should be used at all in our coal mines. Another debatable question is whether workmen are entitled to compensation for the extra difficulties which they have to encounter in the use of this sort of lamp in their work as compared with the use of the naked light. In regard to whether this safety-lamp is of real service or not there seems to be two opinions. There are men who object to use it at all in collieries, excepting to test the gas. I, however, differ with them, for the reason that there is such an event as an outburst of gas. I have witnessed an outburst of gas from the middle of the coal in the face of a heading, bursting out about $\frac{1}{2}$ ton of coal, followed by the gas, filling a space about 20 yards by 3, and 7 ft. in height. If so much gas exploded it would assuredly blown up a branch of the colliery, and kill about 150 men. I have also witnessed an outburst of gas which tore up about 3 tons of hard ground from the bottom, and then following it the gas forced its way out and filled about a mile of the workings. If such an accumulation of gas exploded at the time the men were at work it would have been the means of destroying about 400 lives. It spread over the workings quicker than the men could all be able to run and have their lights extinguished. In these two instances I can state without fear of contradiction that if the men were using naked lights instead of safety-lamps an explosion would have taken place on account of the rapidity of the gas pouring out. In the first case I mentioned the gas hurled the coal against the tram till it was knocked all to pieces. For these reasons I maintain that to use naked lights in such collieries is out of the question.

But there is a possibility of going too far in trusting to safety-lamps. I have no doubt that often managers and other officials have made a wrong use of these lamps by putting the men to work in the middle of gas, and which is a violation of the Mines Regulation Act. I argue that the object of the safety-lamp is to test the gas for the miners' protection in case of outbursts; but that there are collieries that can be worked by the naked light, with the exception of having the other lamps in the colliery to facilitate the testing of gas in the workings at any moment. To the unpractical miner this may seem rather strange; but every experienced miner will appreciate my assertion. I am in favour of the naked light, even in steam coal collieries, where there is not a tendency to occasional outbursts. Safety-lamps are not necessary in collieries where there are no such outbursts of gas, and the lamp does not permit of men working in the midst of explosive gas. This, however, has been done hundreds of times, and the result has been in many cases an explosion. If naked lights were adopted they would never attempt to work without more pure air. With the use of the safety-lamps the officials are too prone to believe that nothing serious can happen, even if an old working place is left empty so as to get filled up with gas. Where naked lights are used the collieries are much healthier to work in, because the officials, as a rule, are more careful to keep fresh air passing through the workings.

Some unpractical men will contend that miners who work by the safety-lamp are not entitled to a higher rate of wages than those who work with the naked light. As a convincing proof to them that they are wrong, I would suggest that one or two of them may be put to work two or three days at the bottom of a coal vessel in coal shipping, both by naked light and safety-lamps; there could be very little doubt as to the result being a change of opinion. In the use of the safety-lamps miners have got to contend with the defects of light, and are hampered in other ways in their work. If a collier's cutting of coal is not clean his wages will be deducted accordingly. If he loses his light, he has to take the lamp of his partner, and to go to the lamp station, perhaps half a mile off, which is the average distance. That means a walk of a mile, and to walk a mile underground is something similar to travelling two miles on the surface. This sort of thing happens once a day on an average. In fact, three-quarters of an hour every day is spent by each safety-lamp miner in getting his light. Another point is that they have not the same amount of light to see dangers ahead. Thus, after taking everything into consideration, I am conscientiously of opinion that 10 per cent. more wages are due to those who work by the safety-lamp than to those who use the naked light. In many cases the percentage would be higher. It must not, however, be distinctly understood that I am not entirely dispensing with the use of the safety-lamp, but I maintain that a thorough investigation should take place at a colliery before introducing its general use; and if it is found to the satisfaction of proper examiners that there is a tendency of outbursts of gas in the workings, then the lamps should be used, but, if not, then the naked lights should be substituted.

Aberdare, June 9.
DAVID MORGAN, Miners' Agent.

—South Wales Daily News.

THE WEST GOLD COAST OF AFRICA.

SIR.—As a specimen of light literature the report of the Tacquah Gold Mines Company is about as amusing as anything I have read lately, and the general doings of the mining companies and their representatives in that lively country is likely to afford such humour for your readers as will rival the weekly comic papers. The ungrateful shareholders are locking the stable door now the steed has departed. The nice little division of 50,000*l.* in cash and 25,000*l.* in paid up shares is a haul not to be made every day out of the flats who subscribe money. It is said out of 58,000*l.* subscribed and expended only 4000*l.* was spent upon the mine. Well, is not that enough to waste in sinking holes? Why spend money in the mine, when the brilliant minds of the vendors, promoters, and directors offer such a profitable field of development by unearthing the talents hitherto buried in oblivion? It is a pity such adepts in finesse and finance should be interfered with in the little game they so well understand by the inquisitorial investigation of prying shareholders, with impudent enquiries as to where the sugar has gone. How unreasonable to expect directors to look after other people's business when they had enough to do in looking after their fees at the rate of 15*l.* a meeting. Happy meetings. I fail to perceive why the calm dignity and serenity of directors of gold mines in such hot countries as the Gold Coast and India should be upset by unreasonable shareholders, who are clamouring for dividends. What on earth do they want? They get a free entertainment and a blow-out twice a year at the general meeting, with an occasional encore, at baiting the Chairman, directors, and managers, and then want dividends as well. Objections are raised that "the authorities on the value of the mine are black men." It is said a certain gentleman is not so black as he is painted; then why should the veracity of a black man, who may be a friend and a brudder, be doubted? One gentleman was thunderstruck at the idea of enquiries being made, it was evidently a case of the "African" frightened at thunder.

If the enterprising superintendent of two companies, who has been waiting for planks and money, has not yet been supplied, I should advise him to cut his two "boards" into planks. So many wooden heads should cut a lot of timber. The Akankoo muddlers are also creating a little stir on the Ankobra, and, from information received, I hear some important despatches have lately arrived from the Gold Coast. Carping critics, patient and vigilant correspondents, and fussy shareholders are wanting to know, you know, where the "planks and money" are all gone to, and why the long expectant dividends are not forthcoming. Another instance of base ingratitude on the part of shareholders for favours conferred by their friends. Not content with having paid some 50,000*l.* for a mine, and had the privilege of spending nearly 40,000*l.* more in experimental philosophy, useful and ornamental works and education, they are beginning to get angry, and are grumbling at getting no results. Surely they don't expect the pleasure of getting dividends and paying calls at the same time. "Grant" their request and they will never be satisfied. It is a "long lane that has no turning," and there is no telling how soon important events may occur. Already bright hopes illuminate the darkened horizon. Important information lately received from the manager, not particularly about so trivial an object

as the mine, but to be guessed at more from the nature of the orders received by the directors than from any information absolutely divulged. It is whispered there is likely to be a grave debate in the board room as to what firms in London or Liverpool shall be entrusted with executing such important orders as have been received, and no little jealousy is likely to be created as to which member of the governing body shall be honoured with the mission of selecting the goods and utensils; but, where such important interests are at stake, they will probably resolve themselves into a committee of the whole, and thereby equally share the honours.

That some scientific problems are to be solved and some valuable discoveries have been made there can be no doubt, that necessitates the urgent demand (not for planks and money), but a dozen inkstands, with a supply of pens, ink, and paper, a dozen dust pans and brushes (some sanguine shareholders believe they are for sweeping up the gold dust flying about), while others attribute the innovation of native customs to the advancing intelligence of the dusky Venuses or African housemaids, who are merely imitating their white sisters' extravagance. It is rumoured that a rich vein—not of gold, not even of humour, but of native guano, has been struck, and that the manager is desirous of making test experiments of its component parts, and that selected samples of this valuable discovery will be sent home for analysis. Should this new discovery be at all equal to the nitrate deposits of Peru the fortunate company that develops this new industry will be richly rewarded for their enterprise. It is hoped the directors will add to the order a cask of best bottled "Burton," a box of long clays, a package of cut "Cavendish," and a few cases of the Cameronian's delight, to help while away the dull times on the coast, and as a reward for enterprise. AXIM.

INDIAN GOLD MINES—THE COLAR DISTRICT.

SIR.—Mr. Moon, formerly manager of the Mysore Reefs Mine, and now hailing from the silver mines in Carolina, has again attacked the Colar mines in last week's Journal, and set forth his opinion in condemnation of those mines. A "Shareholder," who has recently visited the Balaghat Mine, states—"I struck the crowbar at hazard into the reef, and filled a bucket with stone, which I took with me to the surface. There I had it weighed, and crushed it by hand. The yield of gold was simply enormous. The portions of stone taken from where the veins of gold were to be seen yielded at the rate of between 30 to 40 ozs. of gold, one piece weighing 6 ozs., and showing but few signs of gold, yielding over 3 dwts., or at a rate of nearly 800 ozs. to the ton."

This result was obtained after they had got below the old native workings, and justifies the prediction that gold would be found in payable quantities when the old workings had been fathomed. Capt. Bray, well-known as "Tom Bray," has always expected such a result, and has worked away steadily without airing his opinions on comparatively surface trials. The Balaghat Mining Company was formed in India by the Concessionaires and their friends. The share are 150*l.* shares, and were most difficult to get. Other companies, notably the Honnali Gold Mining Company, who purchased from the East India Company for Exploration and Mining (Limited), of Glasgow, a block of 420 acres in the Honnali gold fields, which are situated in the north of Mysore, about 240 miles from Colar and 24 miles from the Bombay frontier, have been formed entirely in India, and are quietly working away, regardless of all Stock Exchange excitement, and confident of success.

The Oregum Company (Colar) has sent home its first 100 ozs. of gold, and the Bangalore Spectator of May 18 last states that another crushing had taken place a day or two previously of 100 tons of quartz, which had yielded 100 ozs. 9 dwts. 17 grs. of gold. The Balaghat Mine, below the old native workings, had yielded 243 ozs. of gold from 40 tons of quartz, or about 5*l*. 10*oz*. to the ton. A special crushing of 19 cwt. had yielded the enormous quantity of 34 ozs. of gold.—June 8.

HOPE.

OLATHE SILVER MINING COMPANY—"HISTORY REPEATS ITSELF."

SIR.—From last week's *Mining Journal* I see it is understood that from \$500 to \$1000 a day is taken out of this mine by parties who are trespassing, and that they are "leaving as much ore in sight as possible." (What for, I wonder?) Your readers will probably have forgotten that when this company was launched in June, 1881, three famous telegrams were stated to have been received from Leadville, and signed "Ashton," who stated "the property could easily pay \$50,000—\$10,000*l.* sterling monthly, that the last discovery was something wonderful—9000 ozs. to the ton—a new Olathe shaft discovered—immense layer, richest free gold gravel—great excitement in Leadville." Can any correspondent tell me why this gold and silver mine, with its immense riches, has not been worked for the last two years, and if the great excitement in 1881 in Leadville has calmed down or blown over.—YORK, June 12.

H. W.

AMERICAN MINES, AND BRITISH CAPITALISTS.

SIR.—I am quite certain that an efficient adviser in New York could throw light on many of the undertakings which have been brought, and are being brought, before the English public—the Belt Mines for instance. I have nothing to say of the value of these properties. The public were asked to subscribe 250,000*l.* I have good reason for saying that the original vendors purchased them for less than \$150,000. At the public meeting in London, reported in the Journal some months ago, Mr. Coxon, M.Inst.C.E., stated that in three months the mine should be paying dividends. Not a boy in the copper region but would smile on reading this, for if the company gets its stamp mill running within a year from the date of that meeting it will do good work. That those mines are worth developing is probably true, but why outrage common sense in making such statements? It may be necessary to give a rosy tint to make a report captivating, but positive statements do not require any tinting.

It is not on Lake Superior, however, where the English people will be out most of their money, even on copper, for more than one concern from the territories will be presented in glowing colours, and probably soon. I hear of a mine in New Mexico which has become a byword, that John Bull (I am an Englishman) will be invited to carefully consider and purchase. The trouble often comes from the man who makes the examination. He is almost sure to be what the Western man calls a "tenderfoot," and by carefully keeping him from making enquiries except of interested parties he is usually brought round to see things as the seller desires.

APACHE.

New York, May 23.

TOCOPILLA COPPER MINING AND SMELTING COMPANY.

SIR.—In the *Mining Journal* of March 3 appeared a letter making comments on the affairs of this company. It would be well to know if the writer, "Observer," has been through Carmelita Mine lately, if not, is he justified in making such sweeping assertions, which must have been gathered from sources not altogether to be depended on. It is not correct that men have been shut in the mine on several occasions. Whether the shops have made profit or loss remains to be seen; but of the latter all commercial men on the coast are aware that trade is in a very depressed state, and it would, therefore, be unfair to put all the blame on the unpopularity of the manager. As a matter of fact, I am not on friendly terms with him, but that does not prevent me from doing business at the Tocopilla Copper Mining Company's stores if prices are reasonable.

With regard to "Tredinnick's Contract," I consider that the payment of 5 cents a drink for each animal where so many are to be supplied, and under certain special conditions of the contract, is not such a losing business, and I have no doubt that the other water sellers in the place would not hesitate long in taking a similar contract. "Observer" says—"Even with incompetent men at the head of affairs, such as an ex-bank manager, and, lastly, a shipmaster, there were much less to complain of; they made good profits, &c." I am the ex-bank manager referred to, and I will suggest that when next "Observer" wishes to make disparaging remarks about it, either past or present management, it will be more manly not to shield himself behind an assumed name. Up to the date of my leaving Bella Vista handsome profits were made, and I consider that

the property was sold to the company on most reasonable terms. Had the vendors received \$0.000*l.* the sum even then would have been a very fair one.

Mr. Tredinnick is, I believe, about to be superseded, and, as a shareholder, I will now say that I have seen many things to cause me to look forward with some anxiety to the next balance-sheet. I did not, however, consider that a manager was likely to be able to do his work more efficiently if he was harassed by finding his management criticised in public papers or by private letters to the directors or Messrs. Taylor and Sons. For this reason I have never either directly or indirectly done one or the other. Doubtless the affairs of the company are under a cloud at present, but I cannot believe that a mine like the Carmelita which made from January 1, 1879, to Aug. 31, 1880, a profit at the rate of \$40,000 per annum, and was at the last-named date in good working order, can have so suddenly collapsed.

W. H. WILLIAMS.

Tocopilla, April 28.

TIN DRESSING.

SIR.—While perusing the *Mining Journal* from time to time I notice occasional reference is made to this most important subject; and here I wish to remind those that are directly interested in such matters that during the last few years much time and capital have been wasted in numerous attempts to place tin dressing on a par with other mining improvements, but to no great practical advantage, and it must be admitted as regards economy tin dressing is where our forefathers left it long ago. No doubt many good inventions have found their way to the dressing-floors, but many of them have soon been condemned and thrown aside, when really the invention could have been a success, but the mistake has been too often in the arrangement or adaptation. Mine managers and others beyond all doubt have made considerable advancements and great scientific improvements in other respects, but generally when they enter into the practical part of tin dressing their great skill appears to be entirely baffled, and in spite of their costly erections and appliances 25 per cent. of the tin that should have been sent to market has been and still continues to be washed down the rivers and lost.

Everybody will agree with me when I say that this is a serious affair, and demands the immediate attention of all that are in any way interested in tin mining. I have reason to fear, however, that this all important subject will only have its due weight and bearing on the minds of managers and proprietors of tin mines in proportion as they become enlightened to their own interest, and are led to see the propriety of the dressing being represented and carried out in all of its detailed requirements as other arts and sciences are, by men of practical experience and ability. My impression is that if all managers who have not a thorough acquaintance with the required treatment of pulverised tin ores, previous to entering into such momentous undertakings, were to condescend to consult their respective tin dressers or some other reliable authority it would relieve them from great mental anxiety, and in many cases save themselves and others from ruinous results. I further believe, were practical tin dressers allowed sole control of the arrangement of machinery and the tinstuff as coming from underground, down through its various processes until finished, that instead of hearing of riches in the Red and other rivers, and only five tin mines in Cornwall paying dividends, in less than one year we should learn that over 50 mines were in the Dividend List, with tin at 55*l.* per ton, and that many others were meeting their cost.

E. PASCOE.

Bugle, St. Austell, June 13.

NEW TERRAS MINING COMPANY.

SIR.—I think your "New Terras" correspondent cannot be well informed about the former working of this mine; that a dividend was made is certainly true, but I sincerely hope the present company will not make a dividend of the same kind as the one referred to. The monthly cost of the former company was from 70*l.* to 110*l.*, and the returns of tin never, as well as I can recollect, passed 300*l.* per month, so your readers can plainly see that the dividend was not made out of the profits of the concern. Your correspondent is evidently mistaken about the price of black tin when operations were suspended by the former company—the last parcel of tin that was sold made between 70*l.* and 80*l.* per ton, which cannot be called a low price for tin. The amount of tinstone available in the property is almost inexhaustible; but I think that it is scarcely so rich as some people may imagine, and those shareholders who think they have a property equal to Wheal Eliza will find themselves slightly disappointed; but I firmly believe with good washing machinery, economical management, and a fair price for tin the mine can be worked at a profit, and I sincerely wish the company every success in their undertaking.—Mina de la Tortilla, Linares, June 6.

MINER.

LEVANT MINE, AND ITS MANAGEMENT.

SIR.—Eleven years since, when the present company entered into possession of this mine, the following report was issued by our managing agent, Capt. Henry Boys:—"The mine with its machinery is a complete wreck, everything being allowed to get in a ruinous condition." The purchase of all the materials at the mine by valuation amounted to 2876*l.* 16*s.* 6*d.* not including 500*l.* for water stamps and tin in slimes. The steam-stamps, having a 30-in. single-acting engine, being the only one capable of repair, the stamps heads being replaced by new. The man-engine, a 20-in., was replaced by a 24-in. The pumping-engine, a 40-in. cylinder, by a new 45-in. All the mine buildings required repair, as well as the burning-houses, two new ovens were made, as also several improvements for the cleaning of the ores. The whole of the pitwork of the mine required renewal, as also the timber-work of the man engine-shaft, and 250 fathoms of tramways were laid down, at the cost of 4355*l.* 17*s.* 7*d.* For repairing the shafts, levels, and opening the mine, in addition to tin sold, the estimated labour cost was placed at 2000*l.* To liquidate these expenses incurred in 1872 calls of 4*l.* per share were made on the 2500*l.* Other calls were made up to July, 1875, during the agency of Capt. H. Boys, amounting to the additional sum of 5*l.* 16*s.* 6*d.* a share. On the retirement of Capt. H. Boys from the management the relinquishment of 50 shares by various shareholders were forwarded, owing to falls in the tin standard. The value of our common tin had receded during Captain Boy's agency from 88*l.* 15*s.* to 47*l.* 16*s.* 6*d.*, and continued to do so for three years, reaching in 1878 as low a figure as 32*l.* 14*s.* a ton. No further call, however, was made until the autumn of 1877, when the mine showed an increased adverse balance in eight months of 874*l.* 6*s.* 2*d.* of which amount 47*l.* 16*s.* 10*d.* had been paid in lord's dues, which were levied for the first time in February of that year, on the occasion of the mine being congratulated by the secretary, Mr. Richard White, on its first profitable account, the balance against the mine having been reduced from 909*l.* 4*s.* 10*d.* to 744*l.* 3*s.* 10*d.*

The resumption of calls, together with the payment of lord's dues at this juncture, when the agents hoped to meet the costs of the mine, gave rise to a strong feeling of dissatisfaction, and the late Mr. N. Douglas sent in his resignation as committee-man, as well as the relinquishment of his shares, as did also Sir James Douglas, engineer, and the highly esteemed representative of the Trinity service. The thorough business habits and unimpeachable character of the former has earned him an enduring reputation. His relinquishment of shares was attended by that of a well-known mine adventurer, the late Mr. N. Pentreath, a worthy sea captain, who, unlike many a Levant adventurer at account meetings, expressed his sentiments as to the disastrous position in which the mine would be placed should a section of the committee succeed (which they afterwards did) in placing our two agents on the same level; on the retirement of these two gentlemen shareholders the management of the mine partook of the character of a ship at sea in a storm. Other relinquishments of shares followed, as might be expected, making a total of 265, which in the spring of 1880 the committee reported they had succeeded in selling for 9*l.* a share, having previously paid off with 1*s.* a share their former holders. Other shares besides the number specified became the property of members of the committee and their friends at the same figure, and were consequently not carried over to the relinquished share.

account. At this time the capital expended on the mine, visible in material, could not be less than £12,000, which if sold by valuation, say, one-half, would be more than double what was paid for the debris of the former company.

R. B. SEARLE.

St. Just, June 12.

TIN MINING IN ST. BLAZHEY DISTRICT, CORNWALL.

SIR.—I am sorry that I am not yet able to make a better report on mining progress in this locality as was anticipated such a short time since, as a company had secured what is considered to be a large and prosperous sett, and that a fair start would have been made ere this; but it seems to be all quiet again, probably owing to serious matters in the county, over which we have no control, which possibly have impeded progress or caused the demur, and in addition to that there are certain individuals disposed to slander.

From 20 to 60 years ago this neighbourhood was working for copper, and could boast of some very productive mines—Fowey Consols, West Fowey Consols, Par Consols, East Crinnis, Old Crinnis, and Pembroke, all worked for copper. This range extended about 3 miles in length, and stretchs line from Old Crinnis to Fowey Consols, which is about from north-east to south-west, would cross nearly the whole of the sets named. Stretch another parallel line, say, $\frac{1}{2}$ mile north-west of the first from Wheal Eliza Tin Mine to Fowey Consols Tin mine, it would cross about the centre of our Wheal Eliza sett. I might also state that we are about equal distance from the two, and almost adjoining Par Consols old sett. Speculators may have different ideas to practical men, but with reference to the St. Blazey Consols sett I would mention it was worked over 30 years ago to about the 40 fms. level in depth, and about 11,000 tons worth of tin was sold therefrom, although the price was very low at the time, and from some other reasons it was stopped. The then manager had two other very important rich mines in hand, but the tin sold from such small workings gave proof of the richness of the lodes worked on. Satisfactory reports from the most eminent judges of tin mining warrants its reworking.

John Polse.

St. Blazey, June 13.

THE LLANGYNOG MINING DISTRICT.

SIR.—Undoubtedly many readers of the Journal are acquainted with this district, and are aware that, owing partly to the necessity of railway communication, it remains almost abandoned. In a letter respecting the Bwlch Creolan Mine, which was published a few weeks ago in the Journal, the probability of a railway being made was mentioned. The line has already been pegged out, and when it is completed it will open up the richest district in the country for producing lead, slates, slabs, clay, granite, china stone, and phosphates of lime. With such a variety of remunerative produce it is to be regretted that mining gentlemen do not give their attention where profits can be realised. In lead properties I may need refer to the historical Craig-y-Mwyn, which was in some manner worked a few years ago by a company known as the East Llangynog Mining Company. The mine was very productive, but through the injudicious proceedings which often take place in a company when the management is not *pro bono publico* it soon collapsed. They stopped all ends, cross-cut, and other exploratory drivings, their chief aim being in working out the lead in sight, and getting as much as they could into the market every month, which in time became exhausted. This mine has paid millions. It is available, I believe, to any enterprising party which in the short life of the East Llangynog Company returned about 50 tons of ore monthly.

I am authoritatively informed that on the north and south lode there is a branch of solid ore, 8 in. wide, standing whole in a winze, which could not be got out by the late company through the influx of water. The Bwlch Creolan Mine, particulars of which appeared in a recent Journal soon came to grief, owing to the lack of unanimity amongst the few shareholders who were developing this excellent mine. Their working capital was insufficient, and though they returned one parcel of ore after erecting costly machinery and getting the mine in excellent condition for good results they allowed the mine to go out of their own hands. I am informed that the liquidator will shortly solicit tenders for the mine, and that some parties are contemplating to purchase it, one of whom is in negotiation for the purchase of the phosphate mine (and patent for making super-phosphate) in the same sett. It is to be hoped that whoever purchases the lead mine will secure the phosphate mine also, and develop them together, which (if I quote the words of a late eminent mining engineer concerning the lead and phosphate mines in Bwlch Creolan sett, when he visited it about two years ago) is "beyond a speculation." Moreover, Dr. Vouller, F.R.S., in his book on phosphatic minerals, commented at length on these phosphate mines, which he inspected several years ago. His analysis was made from a specimen weighing 1 cwt., and gave 29.67 per cent. of phosphoric acid, equal to 64.77 of treble phosphates of lime.

The Blaen-y-Glyn and Pen-y-Craig Lead Mines are still in the hands of some London gentlemen, who do very little in developing them. I am told that several well-known mining engineers have inspected these mines, all of whom have given them a great future if properly developed. I hope in view of the approximation of a railway the proprietors of these mines will shortly commence a vigorous prosecution.

Numerous properties of all kinds, which would occupy too much space to write about, can be acquired, and all worthy of a fair and judicious outlay, without practically having any risk.

Z. J. B.

Llanrhaidr, June 9.

NEW COMPOSITION FOR MINERS' LAMPS.—The object of the invention of Mr. JOHN DARLING, of Glasgow, is the production of a composition or grease which will give to the wick within a lamp a flame of such a nature as to withstand the draughts to which a miner's or other similar lamp is subjected, and at the same time give a good illuminating light. The composition or grease consists essentially of a mixture of tallow, such as cow tallow and paraffin wax, and he has found that an equal proportion of the two substances gives the most generally satisfactory results, but any other suitable proportion of the two ingredients may be used according to the particular purpose for which the light is to be employed or may be found most desirable.

SEPARATING COPPER FROM MATTE OR REGULUS.—In separating copper from matte or regulus containing copper admixed with other metals, the regulus is, according to the invention of Lord Penzance to be granulated or pulverised and treated with concentrated sulphuric acid the specific gravity of which does not fall short of the well known commercial oil of vitriol. The regulus and acid is to be then submitted to heat in any convenient way, and the operation succeeds best if free access of atmospheric air is permitted—exposure on heated pans or plates, or in appropriate retorts, will answer the purpose. In a short time fumes of sulphurous acid gas escape with them a quantity of free sulphur. These increase, and the reactions become more complete as the operation proceeds, and the pulverised mass approaches dryness. The heat should be continued until the regulus which then appears like a grey powder is completely dry, and until no further films come away. As there is a strong tendency in the mass to form into a cake it ought to be constantly stirred, or in some way kept moving during the process. This has also the effect of presenting fresh portions of it to the heated surfaces and favouring the escape of air and the escape of the acid gas. The mass when cold is treated with water when the copper salt formed in the process will dissolve with ease. It is generally the case that one operation does not extract all the copper, and portions of the regulus are found which have never been acted upon. These should be submitted to a second operation of the same kind, and so on until all the copper is extracted. Although it is essential that the acid should be concentrated as above stated a weaker acid may be applied in the first instance with success, which by heating is allowed to concentrate itself with the regulus. The reaction by which the copper is rendered soluble does not take place until the acid is of sufficient density. The sulphurous acid may be used in the chambers for the manufacture of sulphuric acid. The copper may be extracted from the solution obtained, as above, by precipitation with iron or other ordinary methods. His lordship finds that the process is more easy and complete, if any iron that the regulus contains is by any suitable

process extracted before treating the regulus for copper as above. This is particularly true of regulus containing a large quantity of iron.

REPORT FROM CORNWALL.

June 14.—We are another week nearer the time which so often marks the turn of the summer tide for tin; but it does not seem to be one whit easier to make a forecast with any reasonable hope of success. So far as we can see there are signs of improvement amid great sensitiveness and consequent speculative fluctuation; and we are justified, so far as appearances go, in anticipating that the hoped-for improvement will take place. But who can say just now what may be the result of a single week's operations? However, we see no reason to doubt that a steady and sound, if at times seemingly doubtful, improvement is taking place, and that we shall reap a decided advantage ere long.

The nearer the day for the special meeting in Dolcoath approached, the more conflicting and varied were the rumours concerning the form which the proceedings would take; and some very wild remarks were made, and intentions announced. As a rule, however, more moderate and wiser counsels were in the ascendant, especially among those who were more nearly concerned. Whatever there might be to regret in the course of events which led up to the perpetration of the gigantic series of frauds for which Mayne is about to take his trial, and in the want of accurate supervision which rendered the continuance of such a system for so long a period possible—it is impossible upon calm consideration to attach any serious amount of blame—and certainly not the slightest moral culpability—to anyone but the actual perpetrator. Systems of check, as we all know, ought theoretically to be perfect; but in practice perfection is unattainable, and there always must be a liability to be or go wrong where a man or men form part of any machinery.

The special misfortune in the case of Dolcoath has been that the confidence reposed in Mayne, and naturally reposed—for who would have thought such a well-borne character the cloak of masterly hypocrisy—gave him the opportunity of continuing in evil courses long after they would have been discovered in the case of an ordinary clerk, and thus brought home the catastrophe at a time when the mine was least of all able to bear it. The blow from Mayne followed directly upon the crushing demand of Mr. Bassett, and nothing could testify more strongly to the sterling character of Dolcoath as a mine, and to the confidence felt in the integrity of its real management than the manner in which it has rallied from the double stroke. Much of the interest felt in the special meeting arose, not merely from an anxiety to know exactly which the financial position of the concern was as affected by the share frauds, but from uncertainty as to the course that would be adopted to enable Dolcoath to meet the payment of that part of the fine on which the determination of the adventurers had been anticipated by Mayne's fraudulent creation, his confession of which is not withdrawn.

It was inevitable, therefore, with this preliminary feeling that to some extent—perhaps even to a large extent—the results of the meeting should be regarded as somewhat disappointing. All that we absolutely learn with certainty is the extent of the forgeries, which was very well known before; but there is no reason to blame those who were responsible for the conduct of the meeting for the time taken. They were bound to lay before the adventurers all the information possible at the earliest date; but it would have been mere folly to give any information that would defeat the ends of justice, or have a tendency that way. There the matter for the time must rest.

We prefer not to comment at any length upon Mr. Rule's singular line of action. Probably ere long he will see that it was far more eccentric than judicious, as well as unfair. One thing is certain, however, that if Mr. Rule wishes to befriend mining he has adopted a remarkably odd course. Where does he think mining would be if all the men to whom the country looks up for the stability of its chief enterprise were driven out of it? But that is precisely what would be the effect of his procedure if it were intended seriously, and if it could be supposed for a moment that the "Queen" should give him her protection in the manner sought. So far as we are aware, Mr. Rule has always proved pretty well able to protect himself, and there is nothing in this unfortunate Dolcoath business that in any way presses with hindering force upon him. However, it is just possible that Mr. Rule may try to go on, and just possible, also, that it will do no harm if he does. At any rate, if anyone is hurt by his action it would be the committee; and for the rest he must accept the consequences.

No one can complain that Captain Teague has not been sufficiently outspoken on the matter of transfer of shares. "One swallow does not make a summer," and he does not see why one fraud should discredit a system which has hitherto worked well—quite as well, as he says, as the mode of share transfer observed in any other mercantile pursuit. Let officials all do their duty, and he does not see that matters can very well be mended. For ourselves we are not prepared to take up so decided a position. We agree with Capt. Teague that the Cost-book System is in no way fatally discredited by what has taken place, and we have pointed out again and again that any joint-stock company is liable to abuse, and that both ordinary joint-stock companies and limited liability concerns have up to this point a very much worse history in this respect than Cost-book mines. The best thing to be done is to drop all recriminations, and try to devise improvements. Naturally we want no impediments in the way of easy transfer of shares, but we do want security as far as it may be obtained; and it seems to us that there are certain points of detail in which the present system may be improved. Is it not better that the whole matter should be thoroughly discussed under the auspices of the Mining Institute?

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

June 14.—The considerable business which is doing in hoops is the leading current feature in the North and South of Staffordshire. The goods are going out both of iron and steel, the latter not unfrequently being rolled out of crop ends. The markets are Australia, India, South America, and the United States. Sheets are not in diminished request upon last week, though the less favourable cable advices from Australia somewhat checked both on 'Change to-day in Birmingham and yesterday in Wolverhampton, the tendency to a higher ratio of strength, which had been expected to be shown in sheet quotations. Still, sheets were mostly quoted 2s. 6d. per ton in advance of last week's prices. Upon the whole there is more being done at the mills and forges in this and in most other descriptions of finished iron. Plates for girder and bridge work were selling, notwithstanding the weaker prices of the North of England. Marked bars and the other descriptions of high classes of finished iron remain upon the basis of 6s. 2s. 6d. for the Earl of Dudley's Round Oak bar. There was an improved demand for common bars at from 6s. 10s. down to 6s. Sheets to be used, corrugated and galvanised, were quoted on the Birmingham Exchange at 9s. 10s. for trebles, though galvanisers asserted that they could buy at less money. Pigs were moving less tardily. Most business was done in foundry samples at 5s. downwards. Mill and forge proprietors declined to close bargains at present, though they must in a few days begin to purchase on forward account. Forge all-mine sorts were 6s., and cinder qualities 4s. 6d. to 40s. Coal was to be had at low prices, notwithstanding the high wages that the masters are giving. Hopes were expressed by the leading colliery owners that combined action not hitherto attainable will become possible under the new arrangement of a Conciliation Board, composed of representative masters and men. In the expectation that this will be brought about the various colliery proprietors throughout South Staffordshire are being invited to join the re-organised Coalmasters' Association, from which the masters section of the forthcoming Conciliation Board will be selected.

One of the principal spans of the gigantic bridge which the Patent Shaft Company are constructing for the Oude and Rohilkund Railway Company is now erected at the Old Park Works, Wednesbury. The bridge will be the largest ever made in the Midlands, and will consist of seven main spans and nine smaller girder spans—each of the former 356 feet long from the centres of the piers, 25 feet wide,

and 35 feet deep; and each of the latter 114 feet between the centres of piers. It is designed to carry the railway, and a roadway as well, over the Ganges, and is made entirely of steel supplied by the Landore Siemens Steel Company (Limited), Swansea. The weight of each of the large spans is 752 tons, and that of each of the smaller ones 127 tons, and the total weight of the whole will be about 6500 tons. The smaller spans and two of the larger ones have already been shipped to India, and the others will follow as completed. This section of the magnificent piece of engineering work was inspected a few days ago by some of the directors of the railway company, the designer (Mr. W. F. Batho, C.E.), and other gentlemen interested in railway works in India and elsewhere.

The North Staffordshire men, notwithstanding that they have now entered on the fifth week of the strike, are still holding out against the reduction which the masters attempt to enforce, and at one colliery during the week some 600 hands have been allowed to resume at the old rate. Subscriptions coming in from other districts permit of steady payments to Union hands, and in some cases those who are not members of the Union are being supported.

TRADE IN SOUTH WALES.

June 14.—The returns for the month of May at the principal South Wales ports exhibit higher totals than in any previous month. Cardiff sent away 586,402 tons foreign, and 84,200 coastwise; Newport, 128,004 tons foreign, and 84,693 coastwise; Swansea, 92,556 tons foreign, and 76,860 coastwise; Llanelli, 5891 tons foreign, and 12,259 coastwise. The amount of patent fuel sent from Swansea during the month was 30,819 tons, while Cardiff sent away 18,991 tons. Last week Cardiff exported 150,182 tons steam coal foreign, and 14,067 coastwise; Newport, 32,437 tons foreign, and 19,298 coastwise; Swansea, 24,749 tons foreign, and 7232 coastwise. Small steam coal is in great demand at 5s. 6d. per ton, while large coal stands at from 9s. 6d. to 11s. 6d. per ton, according to quality. Such is the demand for steam coal at the present time that even third-class qualities sell readily.

It is authoritatively announced that Messrs. Crawshay Brothers, Cyfarthfa Castle, have become the proprietors of the Newbridge Rhonda Colliery, Pontypridd. The purchase was completed and all conditions agreed upon on Thursday week. On Monday week, Mr. William Crawshay visited the works. There is now, therefore, every probability that the said colliery will be extensively opened, and the works carried on with that vigour for which the name of Crawshay has become famous all the world over.

It is rumoured that sinking in the lower measures at Aberdare Junction is contemplated, and that two or three pits will be sunk. Mr. D. Davies, M.P., Mr. Edward Davies (his son), and Mr. Jenkins, the general manager of the Ocean Steam Coal Company have visited the place, and made a most minute examination of the neighbourhood and its surroundings.

The amount of iron and steel sent away in the month of May was 17,327 tons from Newport; 11,255 tons from Cardiff; and 819 tons from Swansea. Last week Cardiff exported 3339 tons, and Newport sent away some large orders as follows:—Cape Town, 4314 tons; Smyrna, 1827; Stockholm, 700; Paraiba, 640; Monte Video, 553. Iron ore is in little demand. Cardiff received last week 16,103 tons from Bilbao, and 2192 tons from other places. The price stands at from 13s. 6d. to 14s. per ton.

Tin-plates are in better demand, in consequence of the near approach of the time when a reduction of 6d. per box will come into force in the United States. Coke-made stand at from 15s. 9d. to 16s. 6d., while charcoal-made are from 19s. to 20s. per box. It is anticipated that several of the closed works will be opened shortly.

TRADE OF THE TYNE AND WEAR.

June 13.—The returns from Browne's Export List show that a considerable increase has occurred in the exports of coal and coke from the north-east ports during the month of May, as compared with the same month last year. The total exports from the whole of these ports in May were 747,534 tons, as compared with 652,949 tons in May, 1882. This is considered a very satisfactory rate of progress. The demand for the Northumberland steam coal continues brisk, all the collieries are fully employed, and the output is raised as high as possible, yet ships are compelled to wait a considerable time for cargoes; in many cases the price of this coal is, of course, very firm, better rates have been realised in most cases, and still higher are anticipated; 10s. per ton is the usual price for best steam coal at present, less 5 per cent. Considerable progress has been made with the improvements in the harbours at Blyth and Amble, and consequently the shipment of steam coal from Radcliffe and other collieries in the north part of the steam coal district is being considerably increased at those ports. Looking at the increased value of this coal and the reduced rates for shipping at those ports, compared with the cost of shipment on the Tyne, the works in that district will derive considerable advantage from these sources. The mineral traffic in the Blyth and Tyne section of the North-Eastern Railway has been very heavy of late, as might be expected, since most of the pits on the line are fully employed. There is little change in the position of the Durham collieries; but, on the whole, the price of coal of all kinds and of coke is well maintained. This is the dullest period of the year for gas coal, yet most of the works are fairly employed. The shipments of this coal certainly continue good for the time of the year, and the demand for Durham steam, house, and coking kinds continues. The demand for coke on the West Coast has been rather quiet of late; but the consumption in the Cleveland district continues very large, and good shipments have also been made lately to Spain and other foreign and home markets. The shipments of coal and coke at Tyne Dock have been large during the past week, having very nearly approached 100,000 tons. The shipments at the other points on the Tyne have also been large, and on the Wear the shipments of all kinds of coal and also of coke continue large and steady.

At the Durham Coalowners and the Miners' meeting of the Durham Federation board, held on Monday, at the Miners' Hall, Durham, Mr. William Crawford, the miners' agent, reported that a meeting took place between the representatives of the board and of the Durham Coalowners' Association on Saturday last at the Coal Trade office, Newcastle, Mr. Henry Murton Biddick presiding. The representatives of the Federation Board made an application to the coalowners to revert back to the system of 10 hours per day for coal drawing, and also the claim for an advance of wages for boys both above and below 16 years of age. The coalowners after hearing arguments *pro* and *con*, agreed to forward their reply in writing to the Federation Board. A question was then raised with reference to the wages of the cokemen, who claimed an increase of prices. The matter was referred by mutual consent to the decision of Mr. Meynell, the Chairman of the joint committee, and Judge of the Durham County Court. The average of the wages made by hewers in the county, was also discussed, and eventually the question was referred to the considerator of the sliding-scale committee.

The Iron Trade continues very quiet, and buyers still hold off, and wish to purchase at even lower rates than the present quotation. The restriction of the output of Cleveland pig-iron to the extent of 12½ per cent., which has been continued for a considerable period does not at present appear to be likely to improve the price of iron, as was confidently expected. There has been very little reduction of stock since the spring set in so as to bring down the accumulations of the winter, and now, with heavy shipments, there is only a small reduction of 3139 tons last month. Nearly 9000 tons more Cleveland iron was made in May this year than in May, 1882. All attempts to put up the coal and iron markets artificially appear to be doomed to failure. Makers have accepted this week lower rates, and at present there does not appear to be any prospect of increased value for Cleveland iron unless a considerable rise should occur in the Scotch iron market. There is, however, been a movement upwards in Glasgow warrants during the past few days. The manufactured iron trade does not show any improvement, and scarcely any alteration of any kind. There has been little fresh demand, but orders on hand are sufficient generally to afford full work; the indications are towards lower prices, in sympathy with the continued weakness

in pig-iron. The prices of finished iron are—Ship-plates, 6*l*. 2*s*. 6*d*.; angles, 5*l*. 12*s*. 6*d*.; bars, 5*l*. 17*s*. 6*d*.; boiler-plates, 7*l*. 2*s*. 6*d*. The Scotch market for pig-iron is reported firmer, and in conjunction with the news of the settlement of the strike at Eston, a better feeling has been displayed. Pig-iron, 39*s*. to 39*s*. 6*d*. for No. 3. Warrants are 38*s*. 6*d*. Messrs. Connal's stock of warrants is 77,203 tons—a reduction of 390 tons on the week. Shipments of pig-iron for the week ending Thursday last were 22,655 tons. Coal and coke little changed. The unfortunate dispute which has existed so long between the men and Messrs. Bolckow, Vaughan, and Co., at the Cleveland Steelworks at Eston has happily terminated for the present. Mr. Trow, secretary for the Amalgamated Ironworkers' Association, advised the men to return to work one week on the old terms, and to leave the matter in dispute to arbitration, and the men agreed to these terms, and work was resumed on Monday. Mr. Coleman, stipendiary magistrate, Middlesborough, has been appointed referee in the matter.

At Middlesborough, on Tuesday, the market was well attended, and there was a firmer feeling. A meeting of makers has been held for the purpose of coming to a decision, if possible, as to the minimum price they are to accept for pig-iron, but nothing definite has been determined upon. Another meeting will be held shortly, when the question will be further discussed. For the week ending on Monday 26,522 tons of pig-iron were shipped from Middlesborough. It is expected that the steel trade will revive under the new American tariff.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

There is but little to report this week, and that little of not the most cheerful description. The coal trade is as bad as it has ever been and for a long time past there has been a total lack of enterprise in the development of new works.

The limestone trade is in much the same condition, a number of men have been discharged, and those retained have been served with notice of a reduction of five per cent. on their wages. The works of the Liverpool Corporation New Wales Supply give employment to nearly 1000 men in the Valley of the Vyrnwy, at Llanwddyn, and to nearly as many along the line of the Aqueduct, which is about 70 miles in length. These works absorb to a large extent the surplus labour of the district.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

June 14.—There has not been much change in the state of trade during the past week, the miners being still on short time, and likely to continue so for some time. In both Derbyshire and the West Riding of Yorkshire just now the state of the coal trade is such that owners are now working without profit. Under such circumstances they are now seeking for a reduction of the rate by railway to the Metropolis in particular, to which a large trade has long been done from the whole of the Midland coal field, but this is now threatened owing to the much lower rates charged for the conveyance of coal by sea. The North of England colliery owners have long held a leading position in the London market owing to the low charge for the coal sent by screw-steamer to the Thames. Now, however, they are threatened with an invasion from another direction in the shape of a scheme for bringing Scotch coal to London by screw-steamer of a large size. The Clackmannan field, from which it would be brought, stretches along the northern and eastern banks of the Forth river, and her several beds of good coal, the upper seam being 5 ft., and the one below it 9 ft. in thickness, and both of good quality. The cost of carriage it is stated would be less than 5*s*. per ton, and it has been calculated that the coal could be delivered to the London consumers at 16*s*. per ton. The rate by railway at the present time is about 3*s*. 9*d*. per ton for 100 miles, irrespective of truck hire or City dues, so that there is a considerable margin in favour of sea-borne coal as regards cost of conveyance.

Coal carried by railway, however, has some advantages over that taken by sea, but it is felt by the colliery owners that were the railway companies directly connected with mining districts, and having termini in the Metropolis, to make a concession of from 10*s*. to 1*s*. per ton in the rate, there would not be so much to fear from the threatened invasion of Scotch coal. The inland colliery owners would also be able to compete more successfully with the coal sent by railway from the North of England, the ultimate result of which would be a marked increase in the quantity of coal carried to London by the leading lines of railway. With respect to the traffic of late, however, it may be said that some considerable changes took place during May, both the Midland and London and North-Western companies showing a large falling off in the tonnage carried as compared with either of the two previous months. The greatest falling off was in the tonnage sent from the Derbyshire and Nottinghamshire coal fields, which, it may be said, supply more than two-fifths of all the coal that is sent by railway to the metropolis. On the other hand, the Great Western, taking most of its coal from South Wales, shows to more than usual advantage. The Great Northern, taking from both the West Riding and Derbyshire, carried more in May than in either of the two previous months. The tonnage carried by the various lines during the last three months was as follows:—

	Tons March.	Tons April.	Tons May.
Midland	152,387	158,323	169,739
London and North-Western	137,060	146,001	129,316
Great Western	83,871	79,636	100,233
Great Northern	92,362	91,289	95,492
Great Eastern	73,764	56,932	55,376
Other lines	6,372	9,355	6,753
	585,726	581,535	556,909

From the above figures it will be seen that the Midland carried 28,503 tons less coal to London in May than in the previous month, and the greater part of the falling off fell to the lot of the collieries in the Chesterfield district. From Clay Cross less than 12,000 tons were put on to the Midland last month, while Eckington only put on 6500 tons, and Grassmoor 4800 tons. There is nothing new to report with respect to the trade in Sheffield, the makers of armour-plates being most active, as are most others connected with the rolling of iron. The cutlery branches are also doing well, a good deal being done on American account.

BEST METHODS OF WORKING COAL.—The Mining and Working of Coal Mines in North Staffordshire formed the subject of an interesting paper by Mr. James Morgan, of Burslem, read before the North Staffordshire Mining Institute at Stoke-on-Trent, on Monday, Mr. F. Silvester in the chair. With regard to winding-engines, Mr. Morgan expressed his preference for the horizontal coupled engine, because it could be more easily cleaned and repaired than the vertical, and was more compact, and every part was immediately under the engineman's eye should any defect arise. As to pumping-engines, the ordinary rain or bucket-lifts could be applied in most cases to do very useful work, but generally at a very heavy cost; but circumstances must to some extent assist in determining the power and form of engine required. The pit bank should be laid out, and everything arranged so as to cause as little delay and breakage of coal as possible; and he advised iron pit wagons with steel wheels. He advocated the process of tubbing for keeping back water in sinking, instancing the Shire Oaks Colliery, where it had been successfully applied. He spoke of the pulrometer as useful in shallow sinkings. It is quite portable, would pump dirty water, gave off no exhaust steam, required no skilled attendance, and seldom got out of order. It was being successfully applied at Tunstall at the present time. He thought it might be used in deep workings where the vertical height did not exceed its power. He spoke of the importance of maintaining strict discipline in underground workings, and pointed out that the so-called practical miner, if left entirely to his own judgment, often destroyed more than half the produce of his labour. If blasting was to be permitted the position of the shot-holes should be worked out by a competent man, whom the law required to fire shots. No blasting should be allowed where there was any quantity of gas. The use of the wedge should be better

understood, and more judiciously used for headings. Most of the seams in North Staffordshire might be so holed that the coal would come down with its own weight, and the natural pressure of surrounding strata. He showed by diagrams the methods most adopted in North Staffordshire—the post and wall and the longwall—and pointed out their advantages and disadvantages. His remarks were in favour of the longwall system under all ordinary circumstances.

ROCK-DRILL COMPETITION.

The Royal Cornwall Polytechnic Society has just issued its prize list for the current year, and as it is intended to make the trials of rock-drills and of gas-engines a special feature in this year's Exhibition there would appear to be a far better opportunity for individual inventors and manufacturers to demonstrate the superiority of their machines in a manner that will satisfy users than by any challenge trial that could be devised. The mechanical department is admirably arranged for practical utility, and the first section of it will be especially attractive to all connected with mining. Medals are offered by the Society for:—1. Rock-drills, applicable to the county, to be tested in competition (provided not less than three entries be made) as to power and economy, and upon such conditions as the judges shall determine. 2. The best non-conducting material (harmless in its effect on metals) for covering steam-boilers, cylinders, and steam-pipes, to be tested in competition as to its waterproof qualities, efficiency in resisting the radiation of heat, facility in use, durability, and economy of cost. 3. Gas-engines, to be tested in competition (provided that not less than three entries be made) as to power, economy, general construction, durability, and application to electrical and general purposes, and upon such conditions as the judges shall determine.

That competitors shall be put to no unnecessary expense the committee have arranged that steam and gas shall be supplied free of cost, and that every facility shall be given by the Society for conducting these trials, and for exhibiting all machinery which, moreover, will be carefully placed under cover. Premiums are also offered for competition by the Society for improvements in pump-valves for use in mines; for improved machines for and modes of dressing ores; and for collections of ore and matrix in which the relations of one to the other are carefully marked; and by the Editor of the *Mining Journal* (premiums in books, value 3*s*. 3*d*. 2*s*. 2*d*. and 1*s*. 1*d*. respectively) for the three best papers by practical miners or others engaged about mines, upon a method, mechanical or chemical, of making marketable, with commercial advantage, ores or minerals raised from mines in Cornwall or Devon, and hitherto regarded as worthless. The books are to be chosen by the writer of the paper. In the case of mechanical methods not in actual use, it must be demonstrated that the apparatus is simple, durable, and not likely to get out of order. In the case of chemical methods not in actual use, samples of the products in the various stages must accompany the paper in proof of the practicability of the process. Among the other encouragements offered are a premium of 2*s*. by the Society, and 3*s*. by Col. Tremayne, for the most exact account of the phenomena of mineral veins in any mine or district; their dip, direction, variations in productiveness, slides, heaves, &c.; and a premium not exceeding 3*s*. by the Society for accurately drawn cross sections of Cornish mining districts.

With regard to subjects in which the readers of the *Mining Journal* are less immediately interested, it may be mentioned that medals and prizes are offered in naval architecture, fine arts, photography, natural history, &c., and amateurs, professionals, and apprentices are equally considered in the arrangements made. But in a locality like that in which the Society is situated, it is natural that matters directly or indirectly connected with the mining interest, should receive the largest amount of attention, so that the chemical and electrical section is by no means an important one. Medals and prizes in books or money, are offered by the Society for improved applications of chemical science; prizes are offered to students and workmen for analyses of minerals; for monographs on any groups or families of salts, as the phosphates, arseniates, &c., whether occurring naturally or not; for collections of artificial crystals; and a premium is offered for any new and successful experiment in the applications of the electric light for use in mines or otherwise. The subject of the Landers prize this year being Mexico they will doubtless be competed for by many rising young miners (the limit of age of competitors is 18 years) as the country will be alike interesting to them for its acknowledged mineral wealth, and for the renewed attention which is now being given to its mines. Four prizes are offered for neat and correct maps of Mexico, in which the principal rivers, lakes, chains of mountains, line of sea coast, and the territorial line should be accurately delineated; and the sites of the most important cities and seaports, with their latitudes and longitudes, should be correctly marked, also the lines of railway opened and projected. The map should be accompanied by the best information (with reference to authorities, which must be quoted) respecting the great physical features of the country, its rivers, the characteristics of the principal chains of mountains, their general direction, height, geological and mineralogical features, more important passes, limits of perpetual snow, and the elevations at which various trees and plants will flourish on their sides; or information respecting its history, the population of its principal towns and cities, with the statistics of their trade and manufactures, or the natural productions of the country, zoology, botany, &c. A really good map, if the essay be incorrect or inadequate, to be entitled to one-half of the relative prize, and vice versa as to good essays, but imperfect maps. It is not expected that each map will be accompanied with information on all the subjects specified; they are named as affording hints to guide the competitors, and prompt them to research, and method in arrangement.

From the large range of subjects included in the prize list it may safely be anticipated that the exhibition will be a highly successful one, and it may be hoped that so far as the question of the respective merits, for Cornish use, of rock-drills is concerned the result of the competition will be conclusive and satisfactory to all concerned.

SOCIETY OF ENGINEERS.—At the invitation of Mr. M. Ogle Tarbotton, M. Inst. C.E., Borough Engineer of Nottingham, and of the Mayor of that town, the Council of the Society of Engineers visited Nottingham last week, and were most hospitably entertained, and conducted over the several extensive waterworks and gasworks in and near the town, the Wollaton collieries, and the lace manufacture of Sir James Oldknow. Other visits had been arranged by Mr. Tarbotton; but, although the visitors arrived in Nottingham on Wednesday evening, and did not return until Saturday, time did not permit of the visits to the new sewage farm and the Radford Gas-works. On Thursday morning the party drove to the new pumping station at Papplewick, about two miles south-east from Newstead Abbey. Here works are in an advanced stage for a very large addition to the water supply of Nottingham. New wells have been sunk into the new red sandstone, about half-way between the water-bearing and water-holding valleys of the River Leen and the Dover Beck, with the object of obtaining about 4,000,000 gallons per day, instead of 1,000,000, as at present obtained by the temporary pumping-engine at this place. This pumping-station, like the others owned by the Nottingham Corporation, is being very tastefully laid out under Mr. Tarbotton, and the most is made of reservoirs and shrubbery to give the works the appearance of a mansion and grounds. From Papplewick the visitors drove to the Bestwood pumping-station, where they saw a pair of the finest rotative beam-engines in the country. Only one engine works at one time, each engine making 12*s*. strokes per minute, and pumping 90,000 gallons of water per hour from a depth of about 200 ft., and forcing it 90 ft. The Basford Gas-works were next visited, and here particular attention was paid to the great extensions now being carried out to meet the demands of the very large area included in the district of 139 square miles supplied. Special attention was directed to a pair of large gas-holders, erected and nearly completed by Messrs. S. Cutler and Son, of London, which are 180 ft. in diameter, and have a capacity of 1,806,000 cubic feet. One retort house in these works represents the production of 3,000,000 cubic feet per day, and the extensions now in progress will make the Nottingham Gas-works

capacity of supply one of the greatest in the kingdom. Like the waterworks, the gasworks are in the hands of the Corporation. On Friday the Wollaton Colliery was visited, under the guidance of Sir James Oldknow. The colliery and pit-works were inspected, and very favourably criticised.

THE GAS INSTITUTE.—The twentieth annual meeting of the Gas Institute commenced at Firth College, Sheffield, on Tuesday,—Mr. Roberts Ormiston Paterson in the chair. The President, in his opening address, referred to the recent International Exhibition at the Crystal Palace as having shown of what development gas was capable. If that display had preceded the electric light exhibition it would have prevented the ruinous launching of gas stock upon the market by timid owners which then took place. The practical failure of the electric light up to the present time as a competitor with coal gas had operated potently in favour of the latter, but while gas had a successful history in the past there were indications that the future would bring with it far severer trials than anything it had yet experienced. It appeared to him that the events of the past year had brought about a crisis in their history, and that unless they took the tide at the flood they must sooner or later give place to others. The claims of vested interest which at one time were considered sacred were no longer so. The Electric Lighting Act passed since their last annual meeting might be instances as a striking example of the spirit of the times. In face of the almighty power of the popular cry—"The greatest good for the greatest number"—no property was quite safe now-a-days, least of all gas property. The President, in conclusion, stated that with regard to the electric light Parliament had invited electricians to lay siege to them, but they did not advance. The gas manufacturers waited their attack, and when they did come the electricians must be prepared to meet a well-equipped and stubborn foe. The gas interest would not yield one inch to them. If the electricians sought for it they might find a place for themselves.

At the resumed sitting on Wednesday, the President announced that the premiums for papers read at the last annual meeting of the Institute had been awarded in the following order:—First, to Mr. Vallon, of Ramsgate, on "Experiences of Regenerator Furnace"; second, to Mr. Hunt, for his paper on "Coal Gas as a Heating Agent"; and third, Mr. Livesey, for his paper on "Construction of Gas Holders." Professor A. Vernon Harcourt, of Oxford (brother of the Home Secretary), read a paper on "The Standard of Illumination," showing the disadvantage and untrustworthiness of testing by sperm candles, and the superiority of an air-gas flame as a standard of light. Professor Harcourt's paper was considered of very great value, and a resolution was passed referring the question to the Council of the Institute. Mr. C. E. Botley, of London, read a paper on "The Lighting of Railway Carriages." The result of experiments with compressed coal-gas, stored in receptacles underneath the coaches, he found to be most satisfactory, and he considered that if the system were applied generally it would benefit gas companies all over the country. The Institute afterwards visited the Atlas Works, and in the evening were entertained at a reception in the Cutlers' Hall.

On Thursday Mr. C. W. Folkard read a paper on "Jointing and Testing of Gas Mains," and this was followed by a paper on "Gas Used as a Fuel," by Mr. T. Fletcher, Warrington. He said they must strike out a totally new line if the day consumption of gas was to be anything worth having. To increase that consumption he would offer to fit in every house for nothing, or next to nothing, a good, cheap boiling burner, the first samples being fixed in the houses of every one of the gasworks employees, so that they could both preach and practice. Properly managed, he believed these burners could be got into half the houses in any given district within six months, and the value of the additional gas consumption would average fully 300 per cent. per annum on the first outlay. It would also be a consumption of exactly the right kind, averaging much more in summer than in winter. It appeared to him there was no necessity whatever to attempt to push the use of heating stoves. The majority of people were only too ready to adopt them, but gas cooking was less universally accepted, although for cooking purposes gas excelled every other fuel in every possible way. There was an enormous dormant demand for gas heating for workshop and commercial purposes, which as yet had not been touched to any appreciable extent, and it only required a central place where reliable information could be gained to awaken the demand. A good source of profit was the consumption by gas-engines, but the rate of those was at present limited by their first cost, which was excessive. So long as a steam-engine could be fixed for half, or less than half, the first cost of a gas-engine, the latter was too heavily handicapped, and he suggested that the gas companies should jointly copy the system of the Society of Arts, and offer a prize well worth having for a gas-engine satisfactory in all points, which should cost no more to fit up than a steam-engine. A prize of 10,000*s*. would be exceedingly well expended on that, and would make a great move in gas-engines.—In the discussion which followed the members agreed upon the desirability of paying special attention to the cultivation of commercial custom, and the development of the use of gas as a household fuel.—Mr. Frank Livesey, of London, read a paper on "A Description of Three Different Methods of Sulphur Purification," after which the Institute adjourned for luncheon.

TREATING STEEL INGOTS BEFORE ROLLING.

An improved treatment of steel ingots between the time of casting and rolling whereby they are prevented from losing their initial heat, and have such heat more or less uniformly distributed throughout their mass before being subjected to the rolling operation, has been proposed by Mr. H. J. KENNARD, of Hyde Park-terrace. According to one arrangement, he places over the ingot immediately after removal of the ingot mould and while it is still standing on the base on which it was cast, a cover or casing of metal lined with refractory material which has been previously heated to a sufficient degree, either by having been used previously with other ingots, or by combustion therein of gaseous fuel and air led in through pipes or otherwise, so that little or no heat shall be taken up from the ingot by the casing. The ingot having been enclosed in this manner, he then removes it to any convenient place, where it is allowed to remain covered a sufficient length of time to allow the greater heat contained in the interior thereof to be conveyed by conduction to the cooler outer surface thereof, so that the initial heat shall be more or less uniformly distributed throughout the mass.

This condition having been attained the ingot is ready for rolling, and the cover being removed, is then at once used for enclosing another ingot. In order to enable the ingot to be lifted with the cover, as described, the bottom on which it is cast is made removable, and is provided with hooks or other devices, by which chains or other attachments can be secured thereto after the cover has been put on, so as to enable the bottom, together with the ingot and cover resting thereon, to be removed by means of a crane or otherwise to the place where it is required to stand. The cover may be provided with apertures, through which nozzles may be introduced for blowing in air and gas, in order, by the combustion thereof, to increase or maintain the temperature within the cover while the ingot is being allowed to soak.

According to another arrangement Mr. Kennard provides a truck having a bed formed of refractory material, and a removable cover also having a refractory lining, and he places the ingot immediately upon the removal of the mould upon the bed of the truck and encloses it with the cover, the bed and cover having been previously heated to a sufficient degree either by previous use with other ingots, or by combustion of gaseous fuel and air within the cover, which is for this purpose provided with small apertures through which nozzles for the gas and air supply are temporarily inserted. Such trucks may be used for treating the ingots either singly or two or more at a time. By preference he arranges them to receive four ingots, which he places close together, two below and two above, and he arranges them so that the thin and consequently cooler end of one ingot shall lie against the thicker, hotter end of another ingot, whereby a portion of the heat will be transferred from the latter to the former, and thus the temperature of the whole of the ingots will be rendered more or less uniform, the ingots being retained in the truck until this has been accomplished, after which they are removed and at

Registration of New Companies.

The following joint-stock companies have been duly registered:—
THE TEE HETTON COAL COMPANY (Limited).—Capital 50,000*l.*, in shares of 10*l*. The acquisition of certain collieries near Bishop Auckland, county of Durham, with the freehold, and leasehold, and copyhold lands and business, and all fixed and loose plant, tools, coke-ovens, brickworks, &c., and to carry on, in all their branches, the trades of miners, smelters, colliery owners, chemical manufacturers, and farmers, &c. The subscribers (who take one share each) are—J. Dodds, Ragworth, M.D.; T. Anthony, Swinburne, Capt. R. N.; M. B. Dodds, Ragworth, solicitor; G. Needham, Middlesborough, merchant; R. Long, Middlesborough, accountant; C. Harrison, 67, Lincoln's Inn-fields, solicitor; H. A. Whateley, 67, Lincoln's Inn-fields, solicitor.

THE CABACAL COMPANY (Limited).—Capital 10,000*l.*, in shares of 5*l*. To carry out an agreement in regard to concession granted by the Emperor of Brazil for the right of mining in 150 "Datas," in the region of the River Cabacal. To send out an exploring party to explore the mineral "Datas" included in the said concession, and form a company or companies to work such part or parts of the "Datas" as may be agreed upon, or to carry on mining operations in case the said concession cannot be subdivided. The subscribers (who take one share each) are—G. Shepherd, Tottenham, Major, R.A.; A. J. Shepherd, 39, Vartry-road, clerk; H. A. Miller, 63, Arthur-street, clerk; J. F. Tafe, 118, King Edward's-road, accountant; W. Bower, 35, Mecklenburg-square, mechanical engineer; J. Elton, 65, Upper Tollington Park, clerk; F. F. Robinson, 24, Carlton Grove, clerk. The company shall, unless and until it is formed into a working company, be managed by two directors to be called managers.

G. D. DAVIS AND COMPANY (Limited).—Capital 50,000*l.*, in shares of 5*l*. To purchase and carry on an engineering business established at 669, Commercial-road, Middlesex. The subscribers (who take one share each) are—A. Bryans, 9, Fenchurch Avenue; J. Renny, 8, Union-court; A. Hughes, 25, Old Jewry; W. R. G. Hay, 669, Commercial-road; P. J. Burt, 16, Leadenhall-street; J. Gill, Tottenham; S. A. Dent, Thames Ditton.

MALVERN ASSEMBLY ROOMS AND PLEASURE GARDENS (Limited).—Capital 15,000*l.*, in shares of 5*l*. To provide and maintain assembly rooms, enclosed and recreation grounds, &c. The subscribers are—W. T. Fernie, Great Malvern, 20; C. R. Coxwell, Malvern, 100; J. Atkins, Great Malvern, 100; W. H. Dawson, Malvern, 20; T. Cox, jun., Malvern, 100; J. Cruden, Great Malvern, 20; J. M. Evans, Great Malvern, 10; G. Howell, Great Malvern, 20; J. S. Jenkins, Great Malvern, 10.

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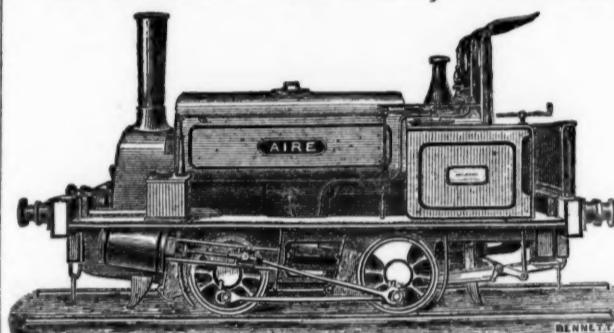
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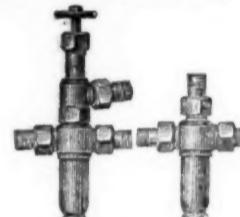
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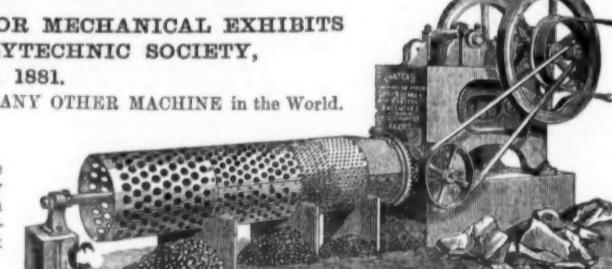
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DEAR SIR,—I am pleased to be able to tell you that the Machine works splendidly. We are breaking 16 trucks a day now and we thought it a good day's work to do 10 a day with the old Machine, so you can see the difference. I had a gentleman looking at it yesterday, and he was surprised to see it work so easily.

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FOREIGN MINING AND METALLURGY.

The tone of the Belgian coal trade remains relatively good. It is, perhaps, scarcely so strikingly encouraging as it was at the commencement of 1883, but still the general tone of affairs continues favourable. Stocks are being accumulated here and there, but these stocks are not at present of much importance. Prices for industrial coal have been generally well maintained at their former level. The depression which has prevailed of late in the Belgian iron trade has thus not at present affected Belgian colliery proprietors. Household coal has also not materially varied in price. Coke has been disposed of with a certain difficulty at 13s. 8d. per ton. Business has become rather more restricted in the Westphalian coal trade. At the same time, quotations have been well maintained, and even shown a slightly upward tendency. A rise does not appear likely, however, to become general in all descriptions of Westphalian coal, although deliveries are still upon a considerable scale. The summer season is considered to be well assured, and a good autumn season is also anticipated by Westphalian colliery proprietors. The deliveries of Westphalian coal to Hamburg have shown a very sensible increase this year. In May these deliveries were 41,580 tons, as compared with 33,810 tons in May, 1882. At Dusseldorf coal has remained firm, and has even shown a downward tendency, although the market for coke has been rather indecisive. It is stated that the working of coal has considerably increased of late in the basin of the Don, Russia, and also in Poland.

There has been scarcely any change in the Belgian iron trade, which is still somewhat depressed. Pig has been scarcely so well maintained in the Luxembourg. It is remarked, however, as a good augury for the future that numerous proposals for business have come to hand for India and other countries. If these proposals should result in contracts a serious revival in affairs may be looked for. At the same time it should be remarked that few of these proposals have come to anything in consequence of the severe requirements of consumers. The proprietors of Belgian rolling-mills have shown a disposition to check working operations rather than to allow prices to be reduced still further. The result of this policy, so far as it has been at present developed, has been a slightly better tone for certain descriptions of products. English pig has at the same time been weak, and has made scarcely more than 2l. 6s. per ton at Antwerp. Charleroi casting pig has made 2l. 18s. per ton; in the Luxembourg prices can scarcely be carried beyond 2l. 8s. per ton. Refining pig has been in no great demand. A quotation of 2l. 6s. to 2l. 6s. 6d. per ton has been adopted by several producers, although certain works still preserve a basis quotation of 2l. 8s. per ton. The difference of 5s. and 4s. 3d. per ton is also still maintained for ordinary pig and mixed pig respectively. The basis price for No. 1 iron appears to be 5l. per ton. As regards the customary difference of 8s. per ton it is firmly maintained at some works, while in many cases concessions for higher numbers have been the order of the day for some time past. Plates have been rather less firmly maintained. No. 2 might be procured at 6l. 16s., and No. 3 at 7l. 12s. per ton. Plates of commerce have been maintained more or less well at 9l. 4s. to 10l. per ton.

In the French iron trade the situation has not materially changed. Merchants' iron has continued to be sold at about an average of 7l. 4s. per ton, but some works have been selling at 7l. 8s. per ton. Plates have gone somewhat lower. M. Pourcel, of Terre-Noire, will take the direction of important steelworks which the house of Haura is about to establish at Bilbao. The probable production of these works is estimated at from 60,000 to 80,000 tons per annum, as the works will comprise two large blast-furnaces, three Bessemer furnaces, three Martin-Siemens furnaces, &c. The tone of the German iron trade is not very brilliant. Prices of pig especially have shown weakness, a convention agreed on by the proprietors of the Seigen blast-furnaces having been broken. Casting pig might be readily procured at 2l. 17s. per ton. Iron has been in good demand, and transactions have been somewhat numerous; but in presence of the low prices current for pig it is probable that reductions will be made from the rates which have been hitherto current. The demand for plates has continued good. The production of the blast-furnaces of the Zollverein in April this year was returned at 276,606 tons, as compared with 254,136 tons in the previous month. The number of furnaces in blast in April was 153, as compared with 150 in March. The aggregate production of pig in the Zollverein in the first four months of this year is returned at 1,113,457 tons, as compared with 1,025,144 tons in the corresponding period of 1882.

AMSTERDAM EXHIBITION.—The British and Foreign Safety Fuse Company of Redruth, Cornwall, have a comparatively small and excellently arranged stand in the English section, where there are exhibited no less than 46 different sorts of their well-known safety-fuses. Among them are fuses prepared for dry, moist, wet, and very wet grounds, whilst others are specially prepared for use at a depth of not less than 60 ft. under water. The stand also contains some of their patent gutta-percha ribbon fuses, which have the advantage of remaining in good condition in every climate, whether hot or cold, and are not subject to deterioration like the ordinary gutta-percha fuse. It is not likely that these fuses will be very largely used in Holland, but being ordered in large quantities for the colonies, and being inspected by a large number of people from different countries, the company have acted wisely by exhibiting at Amsterdam. In conclusion, we may mention that the fuses are arranged in a very nice variety of colours, some of the shades being agreeable to the eyes, and on the whole the stand has a very elegant appearance.

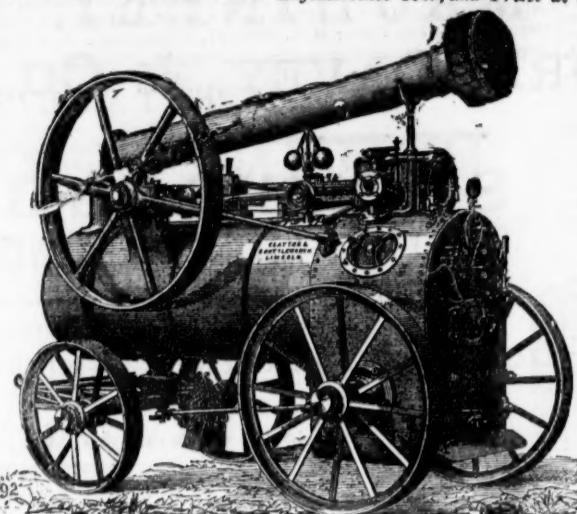
AMERICAN GOLD MINING, AND ITS PROSPECTS.—In reporting upon the trade of California during last year, Mr. Consul Booker states that the yield of gold was about \$1,600,000, or \$1,600,000 less than 1881. This decline Mr. Booker attributes to the suspension of work on some of the hydraulic mines, under injunctions from the courts respecting the disposition of the debris. This vexed question, says Mr. Booker, is now fairly before the courts in two suits. A suit referred to in a previous report, "the People of the State of California *versus* the Gold Run Ditch and Mining Company," was decided in favour of the plaintiff, but an appeal has been made against the decision. The future of gold mining in California, adds Mr. Booker, depends a good deal on the satisfactory solution of the question, as two-thirds of the yield of gold has in late years been obtained by the hydraulic method. It is almost a foregone conclusion, he says, that some check will be put upon the practice of depositing the waste material in the rivers, and it will be found very difficult for some of the companies to find any place of deposit for it without too large an outlay. Meanwhile, the output from the Bodie or quartz mining district shows a decrease of nearly \$1,000,000, almost the whole decrease occurring in the return from the Standard Consolidated Mine. The product from the silver mines of Nevada also shows a continued falling off. In 1878 it was \$34,000,000; in the following year it was \$2,200,000; in 1880 it had fallen to \$14,000,000; in 1881 to \$12,000,000; and in 1882 it was only \$10,300,000. The famous Comstock lode, which has paid in dividends since its discovery \$116,388,000, has paid no dividend for the past two years, and the yield last year showed a decrease of \$1,300,000. Taken as a whole, adds Mr. Booker, mining in Nevada has been very unsatisfactory, and those who have been looking forward to the discovery of a new "bonanza" have become discouraged. Speculation in mining stocks has consequently been reduced to a minimum.

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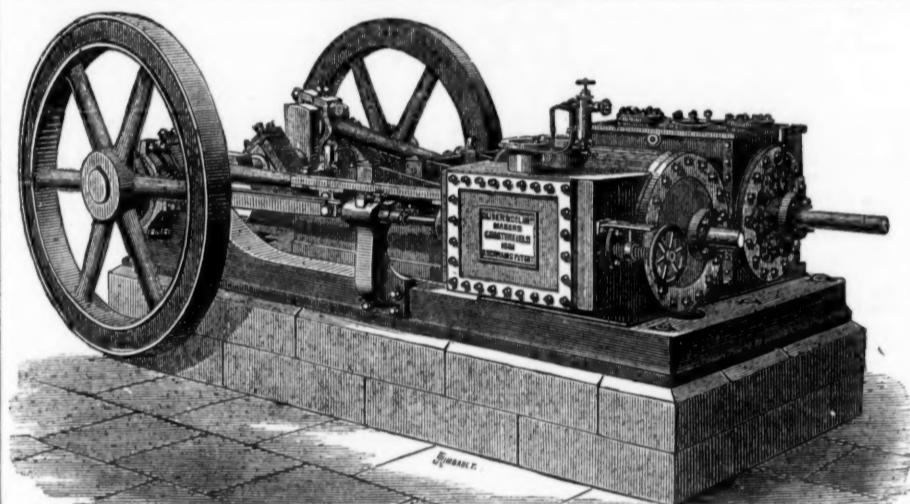
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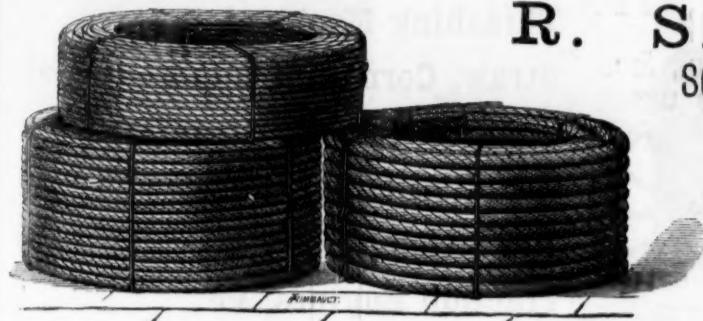
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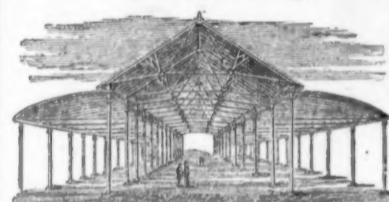
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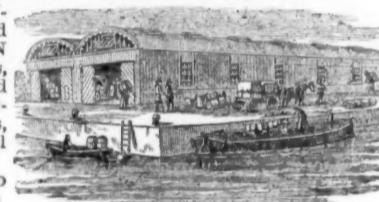
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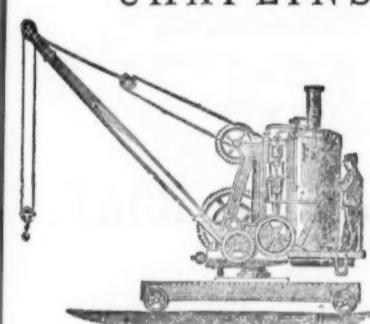
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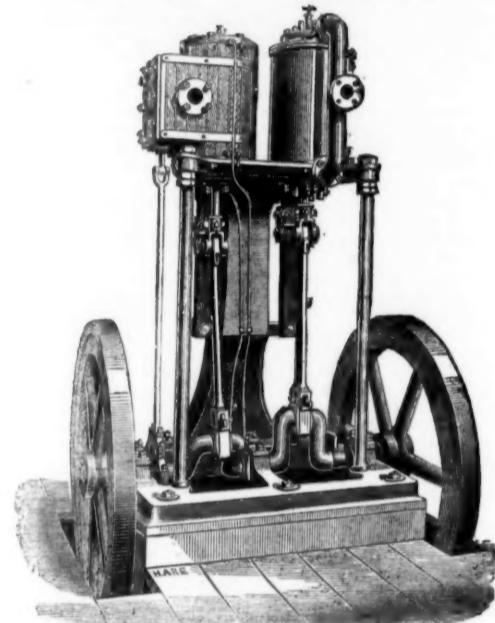
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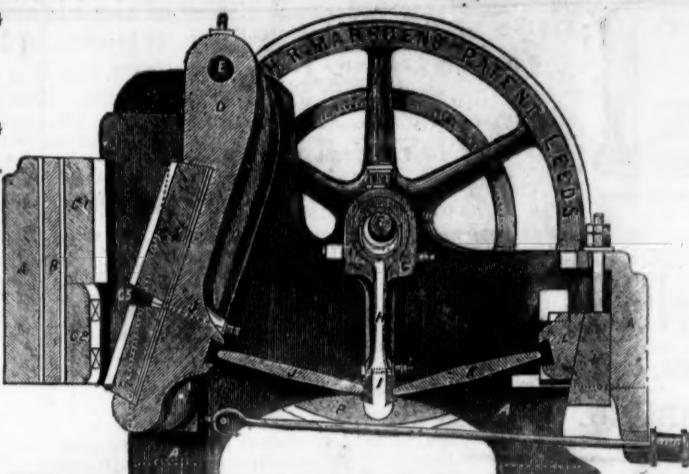
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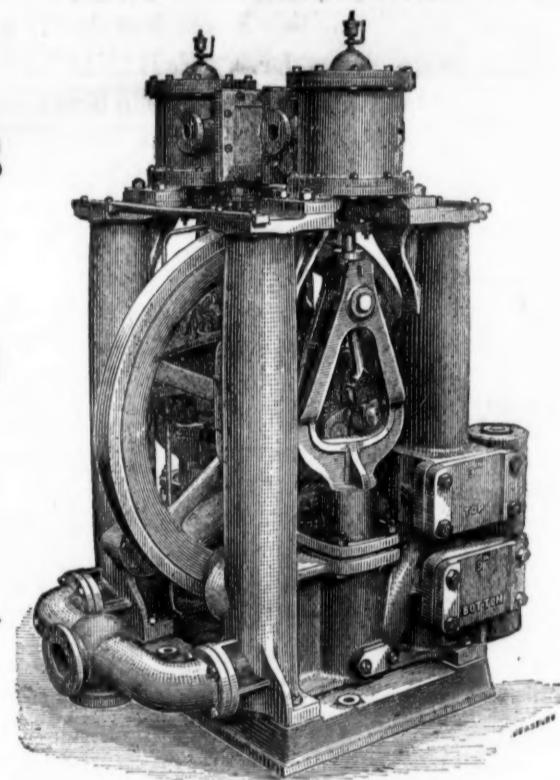
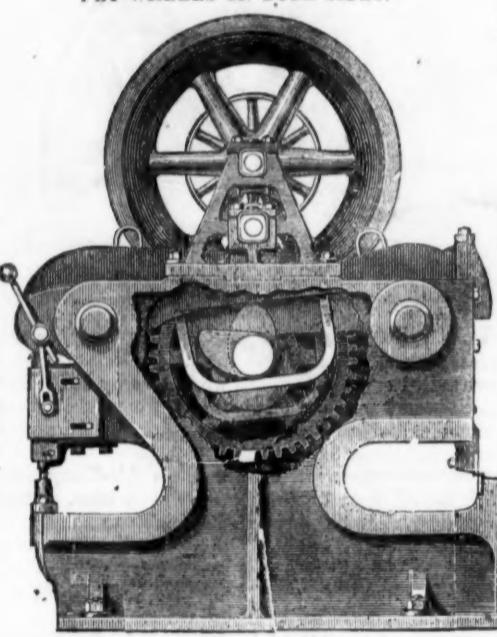
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